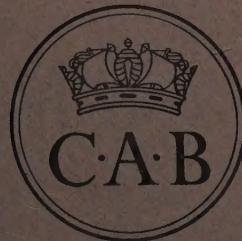


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# THE VETERINARY BULLETIN

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COMMONWEALTH BUREAU OF ANIMAL HEALTH  
WEYBRIDGE, SURREY  
ENGLAND

# Commonwealth Agricultural Bureaux.

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**VETERINARY BULLETIN<sup>T</sup>**

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## DISEASES CAUSED BY BACTERIA AND FUNGI

**RAMMELKAMP, C. H., JR., HEZEBICKS, M. M., & DINGLE, J. H. (1950.) Specific coagulases of *Staphylococcus aureus*.—*J. exp. Med.* **91**, 295-307. [Authors' summary copied verbatim.]** 2172

Three staphylococcal coagulases termed I, II, and III were differentiated by measuring the antibody titer of human sera. Coagulases I and II are antigenically distinct; coagulase III appears to be related to both coagulases I and II. These results were confirmed by specific neutralization experiments. These observations emphasize the importance of employing the correct type of coagulase in studying the role of this substance in the pathogenesis of staphylococcal infections. Preliminary observations in animals indicate that specific anticoagulase develops following induced infections. The role of this antibody in the recovery mechanism remains to be determined.

**PATTISON, I. H. (1949.) The immunisation of mice against Group-B streptococci by the intraperitoneal inoculation of living cultures combined with penicillin.—*J. Path. Bact.* **61**, 337-342. [Author's conclusions copied verbatim.]** 2173

The mouse lethal effect of an intraperitoneal test dose of group-B streptococcus strain S 13 was controlled by 3 intraperitoneal inoculations, each of 1050 units of the calcium salt of penicillin in distilled water, given half-an-hour, 2 hours and 6 hours after the test dose. The same test dose was also largely controlled by a single inoculation of 1000 units of procaine penicillin G given half-an-hour after the test dose. Repetition at 4-7-day intervals of this test dose-penicillin routine created active immunity in mice. Penicillin used as described had little detectable deleterious effect on the immune response of inoculated mice.

**KRAFT, M. E., & SPENCER, G. R. (1949.) In vitro effect of certain antibacterial agents on organisms encountered in bovine mastitis.—*Proc. Soc. exp. Biol., N.Y.* **70**, 176-179.** 2174

Subtilin in high dilution was active against the Gram-positive organisms. Streptomycin was more active against Gram-positive than Gram-negative organisms. *Staphylococcus aureus* and *Salmonella typhi-murium* were resistant to the various sulphonamides. *Streptococcus agalactiae* and *Corynebacterium pyogenes* were sensitive to sulphapyridine, sulphone, sulphadiazine, and sulphamerazine. *Bacterium coli* was susceptible to sulphapyridine, sulphamethazine, sulphadiazine, and sulphamerazine. *Brucella abortus* to sulphamethazine, sulphadiazine, and sulphamerazine, and *Pseudomonas aeruginosa* to sulphamerazine, sulphapyridine, and particularly to sulphadiazine.—W. R. BETT.

**FULLER, R. W. (1949.) Preliminary report on use of sulfamethazine and penicillin in bovine mastitis.—*Vet. Med.* **44**, 103-107.** 2175

Combined sodium sulphamethazine and penicillin therapy was applied in 64 cows with *Streptococcus agalactiae* mastitis. In 94.6% of the infected quarters treatment was successful. Immediately after milking infusions of 50 ml. per quarter of a 10% w/v solution or a 25% w/v solution of sodium sulphamethazine plus 50,000 I.U. of penicillin were made. A single infusion, two infusions at an interval of 24 hours or four infusions at intervals of 12 hours were administered, depending on the severity of the condition. 24 hours after treatment there was improvement and full milk production was resumed after 36-48 hours. Milk was fit for consumption 3-5 days after the last infusion.

Treatment of 42 cows with 83 infected quarters is described in detail.—E.G.

HUGHES, D. L., CHRISTIE, G. J., & FARMER, R. K. (1950.) Procaine penicillin and interrupted penicillin treatment in *Streptococcus agalactiae* mastitis. — *Vet. Rec.* **62.** 11-14. **2176**

Seventy-two hours after infusion of a cow's udder with 100,000 units per quarter of procaine penicillin or calcium penicillin there was seldom any detectable penicillin in the milk. The procaine penicillin persisted for longer than the calcium penicillin. In herds infected with *Str. agalactiae* two infusions of 100,000 units per quarter at an interval of 72 hours yielded, however, over 90% bacteriological cures. Procaine penicillin exhibited no advantage over calcium penicillin in the trials.—R. MARSHALL.

PACKER, R. A. (1950.) The treatment of chronic bovine mastitis with aureomycin. — *Vet. Med.* **45.** 199-201. [Author's conclusions slightly modified.] **2177**

Aureomycin is of definite value in the treatment of chronic bovine mastitis. All 12 cases of chronic streptococcal mastitis treated were negative following treatment. Seventy quarters infected with *Staph. aureus* were given one 200 mg. dose with 34.3% success in eliminating this organism from the udder. Of thirty-five quarters given two injections aureomycin *Staph. aureus* was eliminated from 68.5%. There was no improvement in the two cases of *Bact. coli* infection treated.

HEISHMAN, J. O. (1950.) Report on subtilin and bacitracin as possible treatment for bovine mastitis.—*Amer. J. vet. Res.* **11.** 206-210. [Author's summary copied verbatim.] **2178**

The results of *in vitro* and *in vivo* tests of subtilin, bacitracin, and a combination of bacitracin and penicillin as possible treatments for mastitis are described. In sensitivity tests, both subtilin and bacitracin in combination with penicillin proved to be effective against micro-organisms commonly associated with bovine mastitis. Clinical trials were disappointing in that neither subtilin nor bacitracin proved to be superior to agents now available for treating this disease.

MANNINGER, R. (1949.) Zur Aetiologie der Pferdedruse. [Aetiology of strangles.] — *Acta. vet. hung.* **1.** 73-75. [In German.] **2179**

M. discusses the question of whether a filtrable virus is concerned in the aetiology of strangles and reports evidence in the affirmative.

In 1943 he was carrying out experiments with virus abortion in mares and infected eight young mares with the virus of equine influenza. All the mares contracted this disease, recovered and became immune. Soon afterwards one of the mares had an attack of infectious bronchitis, which spread to the other mares. Four of them recovered completely from infectious bronchitis, but the other four contracted typical strangles 2-6 days after signs of infectious bronchitis had appeared, and *Streptococcus equi* was duly isolated from the mandibular lymph-node abscesses.

There was, thus, evidence here that the predisposition to strangles developed as a result of infection with the infectious bronchitis virus, which was itself clearly distinct from the equine influenza virus.

Arguing from this experience and from statements made in the literature on strangles, M. concludes that *Str. equi* is a facultative pathogenic bacterium which can cause strangles in horses secondarily to some predisposing cause which may either be a virus infection and/or a nonspecific weakening resulting from natural causes, such as fatigue, exposure to adverse weather, etc.

—J.E.

HILLS, G. M. (1949.) Chemical factors in the germination of spore-bearing aerobes. The effect of yeast extract on the germination of *Bacillus anthracis* and its replacement by adenosine. The effect of amino-acids on the germination of *Bacillus anthracis*, with some observations on the relation of optical form to biological activity. — *Biochem. J.* **45.** 353-362; & 363-370. **2180**

The basal media for the germination of *B. anthracis* spores contained acid hydrolysed gelatin and L-tyrosine. Significant acceleration of germination was observed if a boiled extract of yeast was also added. This latter component could be replaced by a purified preparation of adenosine.

Germination in phosphate buffer at pH 7.3 was greatly stimulated by the addition of 500 micro g. M-L-alanine, 500 micro g. M-L-tyrosine and 2 micro g. M-adenosine. L-alanine could not be replaced by related compounds and its action was strongly inhibited by its stereoisomer, D-alanine; this inhibition, however, was reversible. L-tyrosine was replaceable by related compounds and its activity was not suppressed by DL-tyrosine. Seventeen other amino acids were tested, none had a significant stimulating effect; and some (glycine, DL-methionine, DL-cysteine and DL-valine) at high concentrations actually inhibited germination.

—E. EDEN.

BLOCH, H., (1950.) Studies on the virulence of tubercle bacilli. Isolation and biological properties of a constituent of virulent organisms.—*J. exp. Med.* **91**. 197-218. [Author's summary copied verbatim.] **2181**

The bacillary cords characteristic for virulent tubercle bacilli are readily disrupted when wet bacilli are suspended in hydrocarbons such as paraffin oil or petroleum ether. The disruption of cords is due to the removal of a material coating the surface of the bacilli and causing them to adhere to each other. This material can be obtained from virulent bacilli by extracting them with petroleum ether. It is a lipid. Avirulent variants of tubercle bacilli do not yield a similar material after extraction in the same manner; only little of it is obtained from BCG bacilli.

The following properties of the fraction obtained by petroleum ether extraction are described: (a) It inhibits the migration of leukocytes *in vitro*. (b) If repeatedly injected in small doses into mice, it is toxic, whereas a single high dose does not give rise to toxic manifestations. (c) The susceptibility of mice to the toxic action of repeated injections parallels to some extent their degree of susceptibility to infection with the strain of tubercle bacilli from which the fraction was obtained. (d) The injection of the extracted material into guinea pigs does not induce a state of allergic reactivity toward tuberculin.

Likewise, tuberculin-positive guinea pigs do not show hypersensitivity against injections of the extracted substance. Bacilli extracted with petroleum ether do not lose

their viability. They grow out normally *in vitro*, and they are still pathogenic. However, the removal of the petroleum ether-soluble lipid from the bacilli results in a loss of the ability of the organisms to inhibit the migration of polymorphonuclear leukocytes. Moreover, mice and guinea pigs infected with extracted bacilli may develop tuberculosis considerably slower than animals injected with comparable amounts of unextracted organisms.

The significance of these findings is discussed in relation to the problem of the virulence of tubercle bacilli.

MARTIN, S. P., PIERCE, C. H., MIDDLEBROOK, G., & DUBOS, R. J. (1950.) The effect of tubercle bacilli on the polymorphonuclear leucocytes of normal animals.—*J. exp. Med.* **91**. 381-392. [Authors' summary copied verbatim.] **2182**

A description is given of a slide cell whereby the rate of migration of very small amounts of leucocytes can be followed and measured. The migration of polymorphonuclear leucocytes was found to be inhibited by virulent tubercle bacilli pathogenic for the class of animal (mammal or bird) from which the leucocytes were obtained; it was not affected by the avirulent variants of these microorganisms, or by bacilli pathogenic for animals of the other class. Tests failed to disclose that the inhibition of leucocytic migration resulted from any gross damage caused by the bacilli to the leucocytes.

CHOUCRON, N. (1949.) Precipitin test for carbohydrate antibodies in human tuberculosis. [Correspondence.] — *Amer. Rev. Tuberc.* **59**. 710-712. **2183**

C. claims that of the various antigenic substances which have been extracted from *M. tuberculosis*, one, a lipo-carbohydrate, is related to resistance of the host to the pathogen. A carbohydrate hapten derived from the lipo-carbohydrate by hydrolysis causes precipitation when 5 micro g. are mixed with some undiluted sera from tuberculous patients. Of 73 rapidly progressive cases, 23 were positive by this test; of 75 moderate cases, 36 were positive; of 61 regressive cases, 37 were positive. Of 39 cases which had been inactive for two years or less, 22 were positive, and of 50 cases inactive for more than two years, 5 were

positive. Of 99 cases believed not to be tuberculous, 5 were positive. The results are qualitative only. C. considers that the distribution of antibody between the several groups indicates that the antibody detected is related to the patient's power of resistance.—G. FULTON ROBERTS.

BOGEN, E., LOOMIS, R. N., & WILL, D. W. (1950.) Para-aminosalicylic acid treatment of tuberculosis. A review.—*Amer. Rev. Tuberc.* **61.** 226-246. [Spanish summary, authors' summary copied verbatim.] **2184**

Both *in vitro* and *in vivo* laboratory tests, as well as extensive clinical investigations, indicate that PAS is a valuable addition to our therapeutic armamentarium for the treatment of tuberculosis.

Most preparations of PAS so far obtainable are insufficiently pure. If the nauseous and noxious contaminants and degradation products could be eliminated, much of the present difficulties in administering the large dosage of PAS that is essential to its successful use might be obviated. Even with the materials now available, gratifying clinical effectiveness may be demonstrated. Combination of PAS with intermittent treatment with streptomycin greatly increases the applicability and effectiveness of chemotherapy in tuberculosis.

MOESCHLIN, S., & SCHREINER, W. (1949.) Vergleich der Kombinationstherapie von Streptomycin mit Sulfon oder p-Aminosalicylsäure (PAS) bei der experimentellen Tuberkulose. [A comparison of the therapeutic effect on tuberculous g. pigs of streptomycin in conjunction with sulphone and streptomycin in conjunction with PAS.]—*Schweiz. med. Wschr.* **79.** 117-118. [Abst. in *Bull. Hyg., Lond.* **24.** 405. (1949), copied verbatim. Signed: HERTA SCHWABACHER.] **2185**

Seven groups of 20 guinea pigs were inoculated with virulent human tubercle bacilli. Thirty days later, Group 1 was left as a control; Group 2 received para-aminosalicylic acid (PAS); Group 3 received 4-carboxymethylamine - 4 - aminodiphenylsulphone (Sulfon); Group 4, promindiglucose bisulphite (Promin); Group 5, streptomycin; Group 6, streptomycin with PAS; Group 7, streptomycin with Sulfon. The

PAS was given by mouth, the other substances were given parenterally.

All surviving animals were killed 76 days after the commencement of treatment. The degree of tuberculosis at necropsy was estimated by an arbitrary scale (glands, liver, lung and spleen each were allocated a score of 4 points for maximum lesions), so that the range of manifest tuberculosis varied from 0 to 20. The mean figures representing Groups 1 to 7 were 12, 7.7, 6.5, 5.8, 2.9, 1.6 and 1.4 respectively.

Streptomycin acted as a beneficial adjuvant to PAS and to Sulfon. The authors speculate that the results might have been more striking had the dosage of PAS and Sulfon been larger, and believe that combined therapy of this nature offers a therapeutic means of attack for human tuberculosis.

OGINSKY, E. L., SMITH, P. H., & SOLOTOROVSKY, M. (1950.) The action of streptomycin. IV. Fatty acid oxidation by *Mycobacterium tuberculosis*, avian type.—*J. Bact.* **59.** 29-44. [Authors' summary copied verbatim.] **2186**

A study of fatty acid oxidation by *Mycobacterium tuberculosis*, avian type, strain Kirchberg, showed that the oxidation of the higher fatty acids was partially inhibited by streptomycin. The oxidation did not proceed to completion. Streptomycin apparently inhibited the oxidation of the breakdown products of the fatty acids rather than the oxidation of the chain itself. The resistant strain derived from this organism also oxidized the fatty acids, but without comparable streptomycin inhibition.

Similar inhibition by this antibiotic of stearate oxidation by *Escherichia coli* was also observed, although it is evident that the two organisms oxidized this substance somewhat differently. Streptomycin-resistant *E. coli* had lost the major portion of the oxidative mechanism for higher fatty acids.

MILLER, J. B. (1948.) The applicability of surface-active agents in aerosol streptomycin therapy of pulmonary tuberculosis.—*Quart. Bull., Sea View Hosp.* **10.** 155. [Abst. in *Amer. Rev. Tuberc.* **61.** 39-40. (1950), copied verbatim.] **2187**

Surface-active agents lower surface or interfacial tension because one portion of the molecule is hydrophilic; another, lipo-

philic. The lipophilic portion of the surface-active molecule may attach to the lipids at the surface of the bacterial cell while the hydrophilic portion allows greater penetration of the cell by water-soluble substances. Streptomycin is soluble in water but not in oil. As tuberculous caseous exudate contains much lipid material, a surface-active agent may also emulsify this material. Streptomycin is relatively ineffective in the presence of tuberculous caseation and of tissues, like the brain, which are high in lipid content. Triton A-20 (alkyl aryl polyether alcohol) and Tween-20 (polyoxyethylene sorbitan monolaurate) were found to be non-toxic to mice in acute and chronic feeding tests, and then were used in the streptomycin solution administered as an aerosol to 2 patients with pulmonary tuberculosis. In all, 3 humans were given daily aerosol treatment with these surface-active agents for periods up to 95 days without observable ill effects. It is hoped to determine whether the high and prolonged levels of streptomycin in the lungs obtainable by aerosol administration, together with the action of the surface-active agents on caseous material and tubercle bacilli, will be of value in decreasing the present limitations of systematic streptomycin therapy of pulmonary tuberculosis.

DOUB, L., & YOUNMANS, G. P. (1950.) **Studies in tuberculosis chemotherapy. I. Simple primary aromatic amines, *in vitro* and *in vivo*.** — *Amer. Rev. Tuberc.* **61.** 407-421. [Spanish summary, authors' English summary and conclusions copied *verbatim*.] **2188**

This study of a variety of derivatives confirms the prior observation that primary aromatic amines are highly tuberculostatic in simple media. The activity of aniline derivatives containing an alkyl or halogen substituent markedly decreases, depending on the position of substitution in the sequence *para* greater than *meta* greater than *ortho*. The same trend frequently appears in polycyclic systems, e.g., naphthalene, phenanthrene, if the positions of ring fusion are considered analogous to a point of substitution in aniline.

A consideration of examples of inactivating substitution confirms the importance for activity of lipophilic character in the substituent group. Limitations of this type of correlation are discussed, and some

examples are cited of aromatic amines possessing activity which may not necessarily be related to that of primary aromatic amines generally. It appears that the generalised tuberculostatic activity of simple primary aromatic amines is drastically reduced, if not obliterated, by the addition of serum. Nine of these compounds were shown to be without appreciable effect on the course of experimental tuberculosis in mice. The high chronic toxicity of these compounds coupled with their marked inactivation by serum seems adequate to account for the lack of effectiveness *in vivo*.

ILLARTEIN, M., SAURAT, P., & VERGE, J. (1949.) **Sur l'aptitude du cheval à réagir à la tuberculine.** [The tuberculin reaction in horses.] — *Rec. Méd. vét.* **125.** 5-18. **2189**

When the tuberculin test was applied to 273 horses and mules, 10.6% gave positive reactions to bovine type tuberculin and 19.7% to avian type tuberculin. Among these, a group of serum horses yielded 45% positive reactions to bovine tuberculin and 77.5% positive reactions to avian tuberculin. It appears, therefore, that the repeated use of various antigens gives rise to an allergy to tuberculin. This work confirms findings in other countries and bears no relation to the number of clinical cases observed. The authors speculate on the origin of this allergy, whether it is caused by occult lesions or by a degraded type of mycobacterium.—G. V. LAUGIER.

HEIMBECK, J. (1950.) **Tuberkulinreaksjon og immunitet.** [Tuberculin reaction and immunity.] — *Tidsskr. norske Laegeforen.* **70.** 1-4. **2190**

H. discussed the tuberculin reaction and its interpretation in the various tuberculin tests used as deciding factors as a basis for BCG vaccination. He discussed the relative reliability of the Mantoux, Moro and Pirquet tests, of which he considers the latter to be the most reliable, making it clear that by the Pirquet test he means only the test using concentrated old tuberculin without the addition of adrenalin. He points out that, although BCG vaccination was based entirely on the Pirquet reaction, the brochure on tuberculin testing and BCG vaccination issued by the International Tuberculosis Control Campaign mentioned

only the Mantoux and Moro tests, both of which he states have been proved unreliable. The results of work done at Ullevaal, Norway, in 1926, however, proved that the Pirquet reaction gave an indication of the specific resistance to TB.

He states that the Mantoux test often gives false reactions, or reactions which are wrongly interpreted, and that, therefore, this reaction should not be used as a basis for B.C.G. vaccination. He gave some case histories in support of these statements.

H. advocates strict adherence to the Pirquet reaction as a basis for B.C.G. vaccination until such time as it can be proved by systematic experiment and observation that some other test gives more reliable results.

—F.E.W.

**ANON.** (1950.) Up Pirquet, down Mantoux! [The tuberculin test.]—*Lancet.* **258.** 131. [Annotation copied verbatim.] **2191**

The now historic tuberculin-testing and B.C.G. vaccination of tuberculin-negative probationer nurses at the Oslo City Hospital, Ullevaal, which began in 1926, has hinged on the Pirquet test with old tuberculin and without adrenaline. Dr. J. Heimbeck, the author of this undertaking, who has brought the story of it up to date [see preceding abst.] has never been a wild-eyed devotee of the Pirquet test, but he has stuck to it because he could find no better. In his hands it has been quite useful in distinguishing those infected from those not infected with the tubercle bacillus, and in indicating the latter as suitable for B.C.G. vaccination. Once positive, the test is always positive except occasionally in the old and in some severely ill people. All the 1247 Pirquet-positive persons in Oslo whose Pirquet-testing was repeated once or oftener, were found to be again Pirquet-positive, many after an interval of several years. Heimbeck recalls that in Denmark Sigrid Holm showed that 30% of 1243 people who were originally Mantoux-positive became Mantoux-negative after a certain time. Heimbeck writes: "There is therefore only one possible explanation of all the revertors with the Mantoux test: it is that in a great number of cases Mantoux gives a false reaction or one which is interpreted wrongly, and Mantoux is therefore an unreliable test on which to base B.C.G. vaccination." With reproachful surprise Heimbeck refers to

instructions on tuberculin-testing and B.C.G. vaccination contained in a pamphlet published by the International Tuberculosis Campaign. Here an account is given of the Mantoux and Moro tuberculin tests, whereas nothing is said about the Pirquet test "on which" as Heimbeck remarks, "the whole of B.C.G. vaccination is founded." Heimbeck asks—evidently with little hope of a satisfactory answer—what investigations have been carried out with the Mantoux, the Moro, the adrenaline-Pirquet, or other tests which can show as conclusive results as those he has obtained in his Ullevaal nurses with the Pirquet test using old tuberculin and no adrenaline.

**DUBOS, R. J., & FENNER, F.** (1950.) Production of BCG vaccine in a liquid medium containing Tween 80 and a soluble fraction of heated human serum. I. Production and viability of the culture.—*J. exp. Med.* **91.** 261-268. [Authors' summary copied verbatim.] **2192**

**FENNER, F., & DUBOS, R. J.** (1950.) Production of BCG vaccine in a liquid medium containing Tween 80 and a soluble fraction of heated human serum. II. Antigenicity of the culture after various periods of storage.—*J. exp. Med.* **91.** 269-284. [Authors' summary copied verbatim.] **2193**

I. Diffuse, submerged growth of BCG bacilli has been obtained in liquid media containing 0.02 per cent. Tween 80 and the soluble fraction of human serum heated under acid conditions (pH 2.2) at 65°C.

In the absence of glucose or glycerine—which had a detrimental effect on viability—these cultures consisted predominantly of cells that were living and that remained viable during prolonged storage at temperatures ranging from 4 to 37°C.

II. Groups of guinea pigs were vaccinated by the intracutaneous route with cultures of BCG grown in a liquid medium containing Tween 80 and the soluble fraction of heated human serum. After the cultures had been stored at 4°C. for various periods of time, the antigenic response was compared with that of another group of guinea pigs receiving standard BCG vaccine prepared by the conventional technique.

The local lesions occurring at the site

of injection of cultures in Tween-serum filtrate medium were more severe than those produced by the standard vaccine. It was shown that this difference was probably due to the much larger number of viable bacilli in the former preparations. A marked degree of sensitization could be produced with culture dilutions containing as few as 10 viable units (single bacilli or small clumps). Slightly larger doses of BCG led to the highest degree of tuberculin allergy detectable by the technique employed. Further increases in the dose of vaccine failed to alter the level of sensibility when the animals were tested with tuberculin 5 weeks after vaccination.

The same degree of sensitization was achieved by vaccination with 0.1 cc. of either the standard vaccine or any of the fresh or stored cultures in Tween-serum filtrate medium. It was shown that these doses contained numbers of living bacilli far greater than the minimal number required to induce maximal sensitization.

Under the conditions used, the guinea pigs vaccinated with cultures of BCG (fresh or stored) grown in the Tween-serum filtrate medium exhibited a marked degree of resistance to subcutaneous infection with virulent tubercle bacilli.

**LOWE, J. (1950.) Treatment of leprosy with diamino-diphenyl sulphone by mouth.—*Lancet*. 258. 145-150. [Abst. from author's summary and conclusions.]**

2194

The special properties of diamino-diphenyl sulphone (D.A.D.P.S.) are outlined. *In vitro* and in animals its antibacterial power is possibly the greatest of any of the sulphones.

The accepted idea that D.A.D.P.S. is too toxic for use in human beings is examined and found to be erroneous. A régime of oral administration of small doses, rising very slowly from 100 mg. a day to the standard 300 mg. a day in 5 weeks, is recommended, treatment being continuous. This régime does not produce toxic effects of any consequence, and it will maintain a blood-level of about 1 mg. per 100 ml., which on theoretical grounds should be a therapeutic level in leprosy. The almost complete absorption from the gut and slow elimination by the kidney explain the relatively high blood-levels attained with such

small doses, and also explain the toxic effects reported with the much higher doses used by others. In the avoidance of toxic effects, very slow induction of D.A.D.P.S. treatment is of paramount importance.

A therapeutic trial of this treatment in 88 patients with leprosy for periods up to a year is described. Of the fifty lepromatous cases treated for more than 6 months, none show deterioration; 72% show clinical improvement; 62% show bacteriological improvement; and three have become bacteriologically negative. These results compare very favourably with those seen here with complex proprietary sulphones. There are indications that D.A.D.P.S. is acting more rapidly than these other sulphones.

In fifteen "tuberculoid" cases treated for 4-10 months the response has been apparent within a month, and sometimes within a fortnight or less, with complete subsidence of activity of the skin lesions within 6 months; the nerve involvement, however, takes longer to subside. The results, though similar to, appear to be more rapid than those seen with other sulphones in similar cases.

It is suggested that the more complex sulphones act by being hydrolysed to D.A.D.P.S. in the body. They are incompletely absorbed from the gut and incompletely hydrolysed to D.A.D.P.S.; they thus provide an unnecessarily elaborate and expensive method of securing the action of D.A.D.P.S. in the body. Administration by injection, by preventing hydrolysis in the gut, may even reduce their therapeutic activity. The administration of D.A.D.P.S. itself by mouth is safe, simple, and very cheap. It seems to be the most rational form of sulphone treatment.

Reconsideration of the sulphone treatment of human tuberculosis may be advisable in the light of the findings recorded here. Preliminary observations show that D.A.D.P.S. treatment as here outlined is well tolerated by patients with tuberculosis of the lungs.

**LEVI, M. L. (1950.) The susceptibility of voles to *Mycobacterium johnii*.—*J. comp. Path.* 60. 10-16. [Author's summary copied verbatim.]**

2195

A chronic disease characterised by an absence of clinical symptoms with very little tendency to macroscopic lesions was pro-

duced experimentally in voles after feeding and intraperitoneal inoculation of *Mycobacterium johnei*. Active multiplication of the organisms did, however, take place and epithelioid-cell granulomata without necrosis, caseation or calcification were seen in the omentum, liver, spleen, lungs, mesenteric lymphatic nodes and intestines. In some cases, Johne's bacilli were excreted in the faeces. In a limited number of experiments the vole was found to react to avian tubercle bacilli in much the same way as to Johne's bacilli.

STANSKI, F. (1948.) Zaraza bydla i dziczych w oświetleniu przypadków u importowanego bydla z Danni. [**Hæmorrhagic septicæmia in cattle imported from Denmark.**]—*Med. weteryn.* 4. 167-168.

2196

Epidemics of hæmorrhagic septicæmia in cattle in some north-eastern and south-western districts of Poland were associated with the importation of 849 Danish heifers in the spring of 1947, of which 82 had died of the disease. Death was attributed to weakened resistance resulting from transport, change of climate and, in some cases, pregnancy. In indigenous cattle the infection generally took a milder course. A locally prepared serum was effective in about 70% of cattle in the early stages, but failed when applied in later stages. On one farm six pigs, 15 rabbits and six hens died and *Pasteurella bovisepctica* was recovered from the pigs.—E.G.

LITTLE, P., DEMELLO, G., TANZOLA, J., & SUBBAROW, Y. (1948.) Comparison of mouse-protective tests and chick-protective tests of over 600 chemicals against *Pasteurella multocida*. — *J. Immunol.* 60. 295-302.

2197

Among the large variety of chemicals used only the sulphonamides had *in vitro* activity against experimental *Pasteurella septica* infection in the mouse and the chick.

—D. LUKE.

LEDERBERG, J. (1950.) The selection of genetic recombinations with bacterial growth inhibitors.—*J. Bact.* 59. 211-215. [Author's summary copied verbatim.]

2198

On the basis of previous experimental results, it should be possible to select for

genetic recombinations in mixed bacterial cultures with the help of growth inhibitors. Azide-and streptomycin-resistant mutants were obtained from marked strains derived from *Escherichia coli* K-12. This strain had been shown previously to participate in genetic recombination by nutritional selective methods. Recombinant bacteria resistant to both streptomycin and azide were selected by plating mixed cultures into media containing both compounds. It was shown that the majority of the dual resistants were recombinants, since they showed reassortments of independent unselected characters, including nutritional requirements, sugar fermentations, and phage resistance. The general applicability of this technique to the detection and study of recombination in other bacteria is suggested.

CLARK, J. B., HAAS, F., STONE, W. S., & WYSS, O. (1950.) The stimulation of gene recombination in *Escherichia coli*.—*J. Bact.* 59. 375-379. [Authors' summary copied verbatim.]

2199

The rate of formation of prototrophs between mutant strains of *Escherichia coli* K-12 can be increased by direct irradiation of the cells, irradiation of the substrate in which the organisms are grown, treatment of the nutrient substrate with hydrogen peroxide, or growth in the presence of sodium azide. Induced back mutation of the strains did not occur with the treatments used; thus the increase of prototrophs must be due to increased recombination.

LABAW, L. W., MOSLEY, V. M., & WYCKOFF, R. W. G. (1950.) Radioactive studies of the phosphorus metabolism of *Escherichia coli*.—*J. Bact.* 59. 251-262. [Authors' summary copied verbatim.]

2200

The synthesis of nucleic acids in a growing *Escherichia coli* culture has been followed quantitatively using radioactive phosphorus. To do this the phosphorus uptake has been correlated with the number of viable bacteria during the several stages of a typical growth curve. The average phosphorus contents are in general agreement with the results of ultraviolet absorption and chemical methods. Experiments indicate that the measured uptake of phosphorus is not primarily used for buffering, and that phosphorus once taken up by the bacteria

does not exchange with the nutrient medium. It is further shown that uptake and a corresponding cell multiplication continue through the stationary phase until the onset of logarithmic decay.

HEAGY, F. C. (1950.) The effect of 2, 4-dinitrophenol and phage T2 on *Escherichia coli* B.—*J. Bact.* **59**. 367-373. [Author's summary copied verbatim.] **2201**

Simultaneous infection with phage T2r+ and inhibition by 2,4-dinitrophenol is followed by immediate lysis of *Escherichia coli* B in nutrient broth or in a synthetic medium containing ammonia, salts, and glucose or lactose, or no carbohydrate. The infecting phage is lost and no new phage is produced. Dinitrophenol inhibits lysis of *E. coli* B infected with phage T2r or with phage T1. In synthetic medium without carbohydrate, infection with phage T2r+ is followed by immediate lysis even in the absence of dinitrophenol. In synthetic medium without carbohydrate, exposure of an uninfected culture of *E. coli* B to dinitrophenol is followed by partial lysis.

JOSLAND, S. W. (1949.) The identification of *S. bovis* *morbificans* infection in New Zealand.—*J. N.Z. Ass. Bact.* **4**. 34-35. **2202**

A report is made of the confirmation of *Salmonella bovis-morbificans* infection from two independent human sources in New Zealand within a period of one year. *S. bovis-morbificans* has yet to be identified from any case of salmonellosis in animals in New Zealand.—M. B. BUDDLE.

EDWARDS, P. R., BRUNER, D. W., & MORAN, A. B. (1948.) *Salmonella infections of fowls*.—*Cornell Vet.* **38**. 247-256. **2203**

Sixty different salmonella types are recorded as having been isolated from a variety of domestic and game birds, but mainly from turkeys and fowls. It is pointed out that infections from which the cultures were derived varied greatly in severity and that, although there was no absolute correlation between mortality and the type of organism isolated, the impression was gained that *S. typhi-murium*, *S. oranienburg*, *S. montevideo*, *S. bareilly*, and *S. newport* produced the highest percentage of deaths.

—J. C. BUXTON.

CANHAM, A. S. (1948.) *Bacillary white diarrhoea of poultry and its eradication in the Union of South Africa*.—*Onderstepoort J. vet. Sci.* **23**. 171-216. **2204**

Details are given of the blood testing scheme for the control of bacillary white diarrhoea in poultry in South Africa. The methods of preparation and standardization of the antigen are described. Complete agglutination in a titre of 1:10 is regarded as a positive reaction. The problem of the intermittent reactor and the false-positive reaction is discussed.—D. LUKE.

WICKWARE, A. B., & BOND, E. W. (1950.) *Studies in pullorum disease*. XXVII. *Serum protein levels of positive, negative and non-pullorum reactors*.—*Canad. J. comp. Med.* **14**. 128-131. **2205**

Serum protein determinations were made by the Kagan method on birds from a pullorum-free flock and from an artificially infected group. About half of the former birds gave non-pullorum reactions. The two groups were done at different times and no comparisons could be drawn. It is noted that the negative and non-pullorum (non-specific) reaction birds had almost identical protein levels (5.91 and 5.92). —R. GWATKIN.

EDWARDS, P. R., BRUNER, D. W., DOLL, E. R., & HERMANN, G. J. (1948.) *Further notes on variation in Salmonella pullorum*.—*Cornell Vet.* **38**. 257-262. **2206**

Following upon their earlier work, in which it had been shown that antigenic differences in cultures of *S. pullorum* were due to form variation involving antigens XII<sub>2</sub> and XII<sub>3</sub>, the authors carried out extensive cultural examinations on 39 fowls which had given positive reactions to antigens containing the XII<sub>2</sub> variant, but which had not reacted to standard whole blood antigen. Eighteen birds yielded *S. pullorum*, and five of the strains appeared to be stabilized in the XII<sub>2</sub> form. Of these eighteen birds, only eight gave positive reactions with standard antigen by tube agglutination test.—J. C. BUXTON.

KARLSHOJ, K., & SZABO, L. (1949.) *Salmonella infections in eggs of ducks*.—*Amer. J. vet. Res.* **10**. 388-390. **2207**

Seven ducks and one drake, free from salmonella infection, were given water con-

taminated with *S. typhi-murium* on five days spread over one month, and, following recovery of the organisms from faeces, eggs laid during the following two months were examined bacteriologically.

It was found that infection existed only on the shells of eggs examined within eighteen hours of laying, and yolk infection was shown to be present only in eggs which had been incubated for eight days at 37°C. Later, yolk infection was found to have subsided and the authors showed that this was caused by the hindrance to bacterial penetration of the egg albumen by H agglutinins.—J. C. BUXTON.

JOSLAND, S. W. (1948.) The identification of *Salmonella* with special reference to serological methods.—*J. N.Z. Ass. Bact.* 3. 51. **2208**

An outline of the procedures adopted for the isolation and identification of organisms of the *Salmonella* group as used at the Wallaceville Animal Research Station, N.Z. Department of Agriculture is described  
—M. B. BUDDLE.

JOSLAND, S. W. (1949.) A note on the use of hydroquinone enrichment media for the isolation of *Salmonella*.—*J. N.Z. Ass. Bact.* 4. 5-6. **2209**

In an outbreak of salmonellosis of cattle caused by *S. typhi-murium*, J. found that primary cultivation of faeces in hydroquinone brilliant green medium proved superior to other methods tested for the isolation of salmonella organisms.  
—M. B. BUDDLE.

I. GOOD, R. A., & MACKENZIE, R. D. (1950.) Chloramphenicol in typhoid fever.—*Lancet.* 258. 611-615. **2210**

II. RANKIN, A. L. K., & GRIMBLE, A. S. (1950.) Treatment of typhoid fever with chloramphenicol.—*Ibid.* 615-618. **2211**

III. RAMLI, A. H. E. (1950.) Chloramphenicol in typhoid fever.—*Ibid.* 618-620. **2212**

I. Chloramphenicol treatment (a total of 19-22 g.) for eight days had a favourable effect on human patients with *Salmonella typhi* infection. In some cases there was also a temporary arrest of faecal excretion of *S. typhi*. Relapses were not prevented in all cases but occurred later than in untreated controls. No toxic effects of the drug were noted.

II. Chloramphenicol when given in sufficiently large amounts (approximately a total of 30 g.) during a period of about three weeks, seemed to be effective against *S. typhi* infection. Relapses did occur after treatment, but no toxic effects were noted.

III. Two hundred cases of *S. typhi* infection were treated daily with approximately three g. doses of chloramphenicol. Responses on the whole were satisfactory, although relapses occurred in 27.5%. Mild toxic effects are described, but it is not clear whether these were directly caused by the drug.—E. EDEN.

HOLM, L. W., & MOORE, W. G. (1950.) Studies on the effect of streptomycin in experimental brucellosis in pigs.—*Amer. J. vet. Res.* 11. 214-216. [Authors' summary copied verbatim.] **2213**

Subcutaneous administration of streptomycin plus oral administration of sulfadiazine on alternate days was as effective as daily treatments, the total dosage of the agents having been the same in each instance. Treatment every other day was as effective when it was started at the time of infection as when ten days were allowed to elapse before treatment was started. Under the conditions of the experiment, *Brucella abortus* was not isolated from the spleens of 70 to 100 per cent. of the treated animals.

HOLM, L. W., & MOORE, W. G. (1950.) Studies on the efficacy of aureomycin and aureomycin-sulfadiazine in experimental brucellosis in guinea pigs.—*Amer. J. vet. Res.* 11. 211-213. [Authors' summary copied verbatim.] **2214**

Aureomycin and sulfadiazine given simultaneously by the subcutaneous and oral routes, respectively, proved to be effective in reducing spleen size in experimental brucellosis in guinea pigs, but they were not as effective as streptomycin and sulfadiazine in eliminating the infection. Treatment begun ten days after infection produced the best results. Administration of aureomycin and aureomycin plus sulfadiazine produced toxic effects in guinea pigs, the combination being more toxic than aureomycin alone.

DEBONO, J. E. (1949.) Aureomycin in undulant fever.—*Lancet.* 257. 326-329. **2215**

Excellent results were rapidly obtained

in all of 24 patients. Treatment is simple, safe, and can be carried out at home, but is expensive. No difference was seen in response between recent and old infections.

—W. R. BETT.

BUNSE, R. (1949.) Anærobiose der Fohlen. [Anærobic disease in foals.] — *Tierärztl. Umsch.* 4. 309-312. 2216

B. reports nine cases in foals from 6-18 months old, of anærobic infection of the masseter muscles following injury to the buccal mucosa. The muscles were much swollen with the result that the foals were unable to chew or swallow. In seven cases the outcome was fatal, but the remaining two recovered after being given polyvalent antiserum prepared from *Clostridium welchii* and two strains of *Cl. œdematiens*, which were apparently the causal organisms.—I. W. JENNINGS.

JAMIESON, S. (1949.) The identification of *Clostridium œdematiens* and an experimental investigation of its role in the pathogenesis of infectious necrotic hepatitis ("black disease") of sheep. — *J. Path. Bact.* 61. 389-402. [Author's summary slightly modified.] 2217

*Clostridium œdematiens* type B is the bacterial cause of black disease of sheep in the North of Scotland. Fermentation reactions cannot be relied upon completely for the identification of *Cl. œdematiens*; but the 17 type-B strains which the author isolated from black disease in sheep failed to ferment glycerol—a finding which supports Turner's results with strains from the same host. Methods of identifying *Cl. œdematiens* types A and B are described and an account is given of tests devised for lecithinase type confirmation. Type-B strains are more fickle in their growth requirements than type-A strains. Consequently many of the tests on the surface of solid media are less reliable for type-B than for type-A strains. A modification of Petrie and Steabben's method proved the most reliable. The production of lecithinase depends upon the medium in which the strains are grown and the limited evidence available indicates that the more rapidly the organism grows the less lecithinase is produced. In black-disease areas 17.1 per cent. of apparently healthy livers from various host species harbour latent spores of *Cl. œdematiens* compared with 1.3

per cent. in healthy livers obtained in areas free from the disease. The pathogenesis of black disease has been shown, by histological evidence obtained from naturally occurring cases of the disease and from experimental evidence in guinea-pigs, to be the activation of latent spores of *Cl. œdematiens* in necrotic foci in the liver caused by the wanderings of the immature liver fluke *Fasciola hepatica*. Attempts to reproduce the disease in rabbits were not successful.

BREUER, G. (1949.) Botulismus bei Pferden. [Clostridium botulinum intoxication in horses.] — *Tierärztl. Umsch.* 4. 303-307. 2218

B. states that, in horses, botulism should be suspected in all afebrile cases of sudden paralysis with atony of the bowels, difficulty in swallowing, and circulatory disturbance.

—I. W. JENNINGS.

MCLEAN, D. D. (1946.) Duck disease at Tulare Lake. — *Calif. Fish Game.* 32. 71-80. [Abst. in *Exp. Sta. Rec.* 95. 253. (1946), copied verbatim.] 2219

An outbreak caused by the toxin of *Clostridium botulinum* type C is described. This outbreak started in the Tulare Lake area in 1938 after the heavy runoff floods of that spring and summer. It continued each late summer and fall through the years following until 1945, when little or no disease was in evidence. The outbreak was associated with irrigation procedures whereby post-harvest flooding and slow withdrawals of water resulted in extensive decomposition of vegetable and animal matter. Changes in the methods in 1942 whereby standing water was avoided are credited with the subsequent reduction of the disease.

BARD, R. C., & GUNSALUS, I. C. (1950.) Glucose metabolism of *Clostridium perfringens*: existence of a metallo-aldolase. — *J. Bact.* 59. 387-400. [Authors' summary copied verbatim.] 2220

The homolactic fermentation of iron-deficient *Clostridium perfringens* [*Cl. welchii*—Ed. V.B.] is inhibited by alpha'-dipyridyl and o-phenanthroline, an effect that can be reversed by ferrous and cobaltous ions but not by Z<sup>++</sup>, Cu<sup>++</sup>, Ni<sup>++</sup>, Mg<sup>++</sup>, Mn<sup>++</sup>, or ferric iron.

Aldolase, the enzyme converting

hexose diphosphate to triose phosphate, was prepared in cell-free form from *C. perfringens* and shown to be inhibited by the same agents that inhibit glycolysis. Furthermore the inhibition is reversed by ferrous, and less completely by cobaltous, ions. The cell-free aldolase also required a reducing agent, such as cysteine, for maximum activation. The essentiality of iron for the function of aldolase offers a possible explanation of the indispensable requirement of iron for clostridial growth and for homolactic fermentation. The occurrence of aldolase as the key enzyme for the transformation of hexose diphosphate to triose phosphate suggests the occurrence of the Embden-Meyerhof system in this organism.

I. TSION, R. A., & AKHMETOVA, F. I. (1946.) [The aetiology of "Suilyuk." (An equine pneumo-mycosis).] — *Veterinariya, Moscow.* 23. No. 10-11. pp. 39-40. 2221

II. NIKOLSKI, Y. D., & BELYAKOV, S. P. (1946.) [The treatment of "Suilyuk" in animals.] — *Ibid.* No. 12. pp. 29-30. 2222

III. NIKOLSKI, Y. D., & BELYAKOV, S. P. (1947.) [Coarse forage as a source of "Suilyuk," and its prophylaxis.] — *Ibid.* 24. No. 5. pp. 40-41. 2223

IV. ISAEVA, T. F. (1947.) [Laboratory experiments on animals infected by "Suilyuk" forage.] — *Ibid.* pp. 41-42. 2224

I. It is stated that the condition endemic in Central Asia and here referred to as "suilyuk" is caused by ingestion of low-grade fodder containing certain fungi, the pasture being uncultivated steppes.

Cultures from the lungs of affected horses yielded *Aspergillus* spp. in all instances; *Penicillium* spp. in 70%; *Mucor* and *Sterigmatocystis* spp. each in 20%. Mice and g. pigs died when bedded on suspected fodder and also fed a dried concentrate obtained from an infusion of the fodder. The authors state that all species of livestock are susceptible to the disease and outbreaks may occur sporadically outside of Central Asia. [See also V.B. 16. 5].

II. A note on the use of symptomatic treatment of this condition.

III. While concurring with the generally accepted inference that "suilyuk"

is caused by a fungus, the authors state that grazing young grass on uncultivated steppes does not by itself cause the disease. Only when the grazing is rough and the vegetation is decayed and damp, or when livestock have been fed on corn or hay grown on recently ploughed virgin land and, particularly, when such fodder is mouldy, does "suilyuk" appear.

In further experiments a number of horses were fed small quantities of mouldy hay mixed with their rations and contracted "suilyuk" after 1-3 months. Another group had their rations augmented by large quantities of straw from areas in which the fodder used in the previous experiments had been grown, the straw having been stored in ricks for four years, and similar disease appeared in them after 6-7 months. A "small amount" of extract from mouldy hay, added to the drinking water of one horse, caused illness after two and a half months [no details about dosage]. Another horse was fed small quantities of hay that had been wetted and then dried [no details]; "suilyuk" symptoms appeared after seven months. On the whole, in these experiments, the worse the fodder consumed the sooner the disease became evident. As a result of these experiments, good forage was fed on the affected farms and the incidence of the disease dropped from about 40% down to 2-3%.

IV. Extracts from decayed herbage infected with *Aspergillus niger* and *Penicillium glaucum* were administered by various routes to 200 mice, 24 g. pigs, five rabbits and six rams and all reacted. Seven g. pigs and 83 mice died. When three of the rams were slaughtered 4-6 months later, and examined P.M., one had lesions similar to those of horses affected with "suilyuk."

Six mice and two g. pigs were bedded on mouldy forage but given good food; three mice and one g. pig died. In affected animals from both these experiments, the lesions being broncho-pneumonia and necrosis in lung tissue, both the above organisms were demonstrated.—F.A.A.

EFIMOV, V. A. (1946.) [Leptospirosis in cattle (infectious jaundice).] — *Veterinariya, Moscow.* 23. No. 12. pp. 14-18. 2225

The work of various Russian authors on bovine leptospirosis is summarized. It is

stated that the organisms enter via the mouth, nose or other parts of the alimentary canal, or through a cutaneous wound. The first indication of infection is swelling of peripheral or visceral lymph nodes. There are three stages of the disease. In the first stage there is a rise of temperature and anaemia is present along with haemolytic processes, hyperbilirubinæmia and hypoglycæmia. In the second stage of 2-14 days the temperature falls with the disappearance of leprospira from the blood and the development of jaundice and kidney disease. In the third, convalescent, period of 2-9 months, there are intervals of improvement and relapse and leprospira are demonstrable in the kidneys. Under sub-freezing conditions they may survive for many months outside the body.

Rats, as carriers, appear to be important agents in the spread of infection. On one farm, where the disease had been prevalent for two consecutive years, rats were seen to sleep on calves and lick milk off their muzzles. The serum of six out of 20 rats formed lysins with *L. icterohæmorrhagiae*, but culture experiments failed.

Some details are given of the preparation of vaccines and of sera from convalescent animals, which are stated to be of value as prophylactic agents. They have been used on many thousand head of cattle in various parts of the country over a period of years. In cattle left untreated among these herds, natural outbreaks of leptospirosis occurred. It is stated that "arrenal," "novarsenol" [compositions not stated] and trypanblue, together with suitable nursing, were sometimes of value in affected animals.—F.A.A.

I. BROOM, J. C. (1949.) **Leptospirosis.** —*Vet. Rec.* **61.** 711-714. Discussion: pp. 718-723 & 724. **2226**

II. JOSHUA, J. O. (1949.) **Clinical aspects of leptospirosis.** —*Ibid.* 714-718. Discussion: pp. 718-723 & 724. **2227**

I. B. discussed the literature on leptospiral infections in animals. He found *L. icterohæmorrhagiae* agglutinins in low titre in two cats. He described the results of agglutination tests on two series of 519 and 121 dogs respectively. In the first series of blood samples from suspected cases, 251 gave positive reactions to *L.*

*canicola* antigen, 30 to *L. icterohæmorrhagiae* antigen and 24 were positive to both, but were not differentiated. The second series included 45 animals with past or latent infections. These comprised 33 *L. canicola* reactors, 10 *L. icterohæmorrhagiae* reactors and 2 undifferentiated.

Over a period of two years, the seasonal incidence of acute leptospirosis in dogs was found to be highest in January and February.

In those cases where the sex of the animal was known, acute leptospirosis was suspected in 4.5 times as many dogs as bitches. Two thirds of the cases occurred in animals under four years of age and the risk of infection appeared to diminish with age.

II. In a series of 100 unselected dogs in a suburban practice, serum from 43 agglutinated leptospira antigen, the ratio between *L. canicola* and *L. icterohæmorrhagiae* being 4:1. The primary clinical disease was found most commonly in the age range ten months to five years. Sera from 38 unselected cats were tested and three were found to have *L. icterohæmorrhagiae* agglutinins. J. believes that leptospirosis occurs primarily as an infection of the urinary tract. The symptoms, methods of diagnosis, the value of penicillin, streptomycin and of serum therapy, and prophylaxis were discussed.

Brion reported that leptospiral icterus has been found in dogs in France, always caused by *L. icterohæmorrhagiae* infection and always very acute in type. *L. canicola* has been detected in cases of nephritis. He had had poor results with penicillin therapy in icteric cases and mentioned that such dogs as recover after penicillin treatment continue to excrete leptospira in the urine.

McIntyre recorded 66 cases of primary *L. canicola* infection in dogs, 80% of which occurred in individuals up to two years of age. The ratio of infected males to females was 13:1. He suggested that B.'s and J.'s theory that the disease is an ascending affection is untenable. He believes infection is much more likely to be intranasal and that the subsequent renal involvement is of haematogenous origin. He described the course of the disease as progressing from an initial bacteræmic stage to a primary renal stage, with acute interstitial nephritis, and a secondary renal stage with chronic intersti-

tial nephritis which may last for months or may proceed rapidly to the so-called Stuttgart syndrome and death. Methods of diagnosis by blood and urine examination were discussed. The blood urea level is a valuable indication of the prognosis of the disease. Pencillin is of value in the treatment of primary leptospirosis, but the response depends largely on the extent of damage to the kidneys. Figures were given to show that 84% of dogs having renal damage, assessed on a blood urea level of 80 mg. per 100 ml., have agglutinins to *L. canicola*.

Cauchi referred to the keeping of cats in food establishments, taking into consideration their value in rodent control.

Field suggested that there should be investigation of cases of bovine haemoglobinuria in Great Britain, in order to determine whether leptospira are ever involved.

—I. W. JENNINGS.

NELSON, J. B. (1950.) Association of a special strain of pleuropneumonia-like organisms with conjunctivitis in a mouse colony. — *J. exp. Med.* 91. 309-320. [Author's summary copied verbatim.] **2228**

An outbreak of conjunctivitis, unaccompanied by involvement of the respiratory tract, is reported in a colony of white mice. A special strain of pleuropneumonia-like organisms was regularly isolated from the eyes and nasal passages of affected mice, but not from the lungs or middle ears. Ocular carriage of these organisms in the absence of an inflammatory reaction occurred in at least 50 per cent. of the adult mice. Transmission to the young was presumably initiated by parental contact, the

*See also absts.* 2306 (*Mycobact. tuberculosis*); 2344-2345 (intestinal flora); 2391 (*B. proteus*, *Ps. aeruginosa*); 2393 (*Staph. aureus*); 2415-2416 (rumen bacteria); 2434 (anthrax, blackleg); 2439 (bacteria in semen); 2456 (thermal resistance of bacterial spores); 2478 (book, diseases of sheep).

organisms being recoverable after the eyes were open, and was continued after weaning by direct contact between cage mates. These organisms were repeatedly established on the conjunctiva of normal Swiss mice by direct contact with infected animals and subsequently maintained there for ten successive passages. Multiplication of the pleuropneumonia-like organisms, which was largely limited to the eye and its appendages, was accompanied by a low rate of conjunctivitis.

KING, T. E., & CHELDELIN, V. H. (1950.)

Pantothenic acid studies. VIII. Growth of microorganisms and counteraction of antimetabolites with a pantothenic acid conjugate (PAC). — *J. Bact.* 59. 229-236. [Authors' summary slightly modified.] **2229**

A pantothenic acid conjugate (PAC) was found to exert growth-promoting activity superior to that of the free vitamin in *Acetobacter suboxydans*, *Escherichia coli*, and *Aerobacter aerogenes*.

PAC is more effective than the free vitamin in reversing the inhibitory effects of alpha-hydroxy-beta, beta-dimethylbutyryl taurine, which inhibits the utilization of pantothenic acid in *A. suboxydans*.

When used with *E. coli* and *A. aerogenes* to counteract inhibitors (2-chloro-4-aminobenzoic acid and salicylic acid), which do not directly affect the utilization of pantothenic acid, the conjugate is similar in its action to the free vitamin. —

It is concluded that PAC is one of the functional derivatives of pantothenic acid in these organisms.

## DISEASES CAUSED BY PROTOZOAN PARASITES

ULLMANN, G. (1949.) Ein Beschälseucheausbruch in Hessen. [An outbreak of dourine in Hesse.] — *Tierärztl. Umsch.* 4. 179-183. **2230**

This is the second part of a paper reporting an outbreak of dourine, in which 3 stallions and 60 mares were severely affected. In the first part the author described the clinical symptoms and treatment.

In this paper he describes the symptoms in four stallions and one mare, in all of which serological tests were negative.

It is generally believed that *Trypanosoma equiperdum*, being a tropical and subtropical form, causes only a chronic infection in European horses, but may become pathogenic when the resistance of a carrier is lowered or the virulence of the trypano-

some is increased. Like many pathogenic trypanosomes, the pathogenicity of *T. equiperdum* is increased by passage, in this case by repeated passage from stallion to mare during service.

With regard to control measures, the author reports that, at the first interzonal veterinary conference in Berlin in 1947, new control regulations were laid down (designated B.E.) and critical comparisons are made with those given in 1911 (designated V.G.), whereby amendments to these regulations are suggested, especially the introduction of prophylactic measures in a district where the disease is chronic and widespread.

Naganol in combination with antimosan causes a temporary relapse after the first injection. The possibility of so provoking a clinical form of the disease in a carrier is discussed and as naganol is a specific for trypanosomes it remains to be shown whether such administration would confirm the diagnosis in doubtful cases.—M.L.C.

**LAUNOY, L., & JEANPIERRE, CL. (1949.) Nouveaux documents sur la prophylaxie chimique de l'infection à *T. equiperdum* du rat blanc, par ingestion de diamidino-diphénoxyptane. [Prophylaxis of *Trypanosma equiperdum* infection in rats by orally administered diamidino-diphenoxypentane.]—C. R. Soc. Biol. Paris. 143. 328-329.**

2231

Trials were made with doses ranging from 10-70 mg. per 100 g. body weight. 10 mg. doses protected rats 5-6 days after ingestion of the drug. Larger amounts increased the latent period, e.g. with 30 mg., protection was obtained after 12-15 days. Two animals (one of which was given 60 mg. and the other 70 mg.) died from toxicity of the drug.—JAS. G. O'SULLIVAN.

**ANON. (1948.) Trypanosomiasis and land usage.—E. Afr. agric. J. 13. 185-186.**

2232

Over vast areas of Africa trypanosomiasis is the limiting factor in agricultural development. Eradication of the tsetse-fly is not necessarily the most satisfactory means of control. In order to create a fly-free area, a major ecological alteration is necessary and the effects of such a change are difficult to prejudge. The ecological implications of long-range tsetse control are of vital importance to agricultural develop-

ment and the system of land usage must be adapted to suit the ecological requirements of fly prevention.—S. BRIAN KENDALL.

**JENNINGS, W. E., & JONES, T. C. (1948.) Surra (trypanosomiasis), with special reference to its treatment with antrypol.—Proc. 4th Internat. Congr. Trop. Med. Malar. pp. 1331-1341.**

2233

The occurrence of surra in U.S. and Chinese army horses and mules in the Burma and China areas during the war is briefly described. Antrypol [suramin] was used in treatment and prophylaxis. [Antrypol is stated on p. 1334 to be an arsenical compound; this is not correct. It contains no arsenic.] Toxic effects were frequently encountered and samples of the drug were sent to America and tested for toxicity on healthy horses. The findings on seven horses are described. Five of them died or were destroyed *in extremis*. The toxic symptoms could be confused with those of severe surra.

In the discussion Bhalero, D.S., asked why naganol had not been used and was informed it was not used because the British had given it up, after trial, in favour of antrypol. [Naganol and antrypol are chemically the same, naganol being the name given to the substance by German originators. Antrypol is the name of the substance as made in Gt. Britain.] Adler, S. stated that stelbomadine [stilbamidine?] had been used with good results in a small number of cases in Palestine. He mentioned this as he did not know of any other record of stelbomadine [*sic!*] being used for trypanosomiasis. [Stilbamidine has been extensively used in Kenya, the Belgian Congo and other parts of Africa.]—M.C.

**FIASSON, R., MAYER, M., & PIFANO, F. (1948.) Le cariacou (*Odocoileus gymnotis*) porteur de *Trypanosoma vivax* au Venezuela. [*Odocoileus gymnotis*, a carrier of *Trypanosoma vivax* in Venezuela.]—Bull. Soc. Path. exot. 41. 206-208.**

2234

In a region where *T. vivax* is found in the blood of cattle, a species of protozoa morphologically identical has been found in *Odocoileus gymnotis* (deer) which is, therefore, suspected to be a carrier.

—MALCOLM WOODBINE.

KRANEVELD, F. C., & MANSJOER, M. (1949.) De levensduur van *Trypanosoma evansi* in gecitreerd en met 0.5% phenol geconserveerd bloed. [The viability of *Trypanosoma evansi* in citrated blood containing 0.5% phenol.]—*Hemera Zoa.* **56.** 286-295. [English and French summaries.] **2235**

Blood of cattle affected with foot and mouth disease, drawn and citrated and carbolised for use in immunization was found to contain *T. evansi* after keeping for six hours. It is suggested that the phenol had not penetrated evenly throughout the blood by that time. The danger of transmitting surra with such blood is discussed.

EUZEBY, J. (1949.) La trichomonose bovine. [Bovine trichomoniasis.]—*Rev. Méd. vét., Lyon et Toulouse.* **100.** 154-158; 211-217; & 251-254. **2236**

This is a general review of the various aspects of the disease written particularly for the benefit of practitioners. Discussing diagnosis in the aborted foetus, E. suggests examining mucus from the base of the tongue and the palate, if fluid from the foetal membranes is not available.

—JAS. G. O'SULLIVAN.

HIRT, E. (1949.) Die Trichomoniasis des Rindes und das Problem der künstlichen Besamung. [Trichomonas infection in cattle and the problem of artificial insemination.]—*Schweiz. Arch. Tierheilk.* **91.** 717-738. **2237**

In the Aargau Canton artificial insemination has been found the most reliable and practical method of rapid control of *Trichomonas* infection.—W. R. BETT.

EDGSON, F. A. (1948.) Mepacrine hydrochloride in the treatment of bovine coccidiosis. Summary of a herd outbreak and its treatment.—*Vet. Rec.* **60.** 517-518. **2238**

Mepacrine hydrochloride gave good results in 12 cases of coccidial infection in an attested herd of pedigree Jersey cattle. Faecal examinations were negative for oocysts seven days after the last dose (which was 1 g. per 200 lb. body weight per day for three days). Toxicity symptoms were absent, but an intestinal sedative or demulcent should be given.—M.W.

MOYNIHAN, I. W. (1950.) The role of the protozoan parasite, *Eimeria acervulina*, in disease of the domestic chicken.—*Canad. J. comp. Med.* **14.** 74-82. **2239**

Large doses of sporulated oocysts caused retardation of growth but no mortality in experimental chicks. A tendency to a lower haemoglobin level in infected chicks, observed in earlier work was not confirmed in later experiments. Total leucocyte and erythrocyte counts were not affected. Avitaminosis A did not increase the pathogenicity of the parasite. *E. acervulina* developed in the upper half of the small intestine and oocyst accumulations appeared as small, white, opaque areas. The infection was self-limiting under experimental conditions. Gross lesions disappeared within 12 days after administration of sporulated oocysts.

—R. GWATKIN.

JOHNSON, J. E., MUSELL, D. R., & DIETZLER, A. J. (1949.) The activity of bisphenols and diphenols against cecal coccidiosis (*E. tenella*) in chickens.—*Poult. Sci.* **28.** 802-810. [Authors' summary copied verbatim.] **2240**

Laboratory tests have demonstrated that several bisphenols and diphenols (compounds of the dihydroxydiphenylmethane type) possess significant anticoccidial activity.

Selected bisphenols and diphenols, fed continuously in the diet gave protection against relatively severe *E. tenella* infections. p,p'-(1-ethylamylidene) diphenol, K6605, 4,4'-isopropylidenebis(2-isopropylphenol), K6606 and 4,4'-isopropylidenedi-o-cresol, K1409 were respectively 1.5, 2 and 2.25 times as active as sulfaguanidine in prophylactic tests. Chickens thus protected developed measurable immunity to a challenging inoculation.

Only the early stages of parasite development in birds were affected by medicated diets containing K6606 and K1409.

The results indicate that certain bisphenols and diphenols may be fed continuously in the diet to afford protection against cecal coccidiosis without interfering with the growth or thriftiness of broilers.

GROSCHKE, A. C., DAVIDSON, J. A., EVANS, R. J., NAROTSKY, S., HAWKINS, P. A., & REINEKE, E. P. (1949.) The effect of

**diphenols and bisphenols on growth and control of cecal coccidiosis in broilers.—*Poul. Sci.* 28. 811-817. [Authors' summary copied verbatim.]**

2241

Four bisphenols were fed to Single Comb White Leghorn male chicks continuously in the mash at a level of 0.3 per cent. for a period of twelve weeks in two experiments. In the first experiment the bisphenols were compared with continuous feeding in the mash of sulfamethazine, sulfaguanidine, and sulfaguanidine as anticoccidial agents for floor-raised broilers. The results indicated that the bisphenols under the conditions employed offered an apparently high degree of protection against coccidial infection and allowed normal growth to twelve weeks of age.

In the second experiment the bisphenols showed no detrimental effects on shank pigmentation, market quality of dressed carcasses, or flavor of meat in battery-raised broilers. When tested for estrogen-like activity as measured by testes weight and blood fat against other known fattening agents (dianisylhexene, 6-Methyl thiouracil and stilbestrol) one compound (K6605) tended to depress testes weight slightly and another (K3579) tended to increase testes weight. Significant changes in blood fat levels were not observed as a result of continuous feeding of bisphenols under the conditions employed.

**TRAGER, W., & McGHEE, R. B. (1950.) Factors in plasma concerned in natural resistance to avian malaria parasite (*Plasmodium lophuræ*). — *J. exp. Med.* 91. 365-379. [Authors' summary slightly modified.]**

2242

The plasma of adult fowls, when injected into young chicks or chick embryos infected with *Plasmodium lophuræ*, lessened the parasitemia. The substances responsible for this effect were inactivated or removed by the heating of adult fowl plasma for half an hour at 65°C., followed by centrifugation to remove the coagulated material; but they were not affected by heating for half an hour at 56°C. The active materials were present in the euglobulin fraction of hen plasma.

In similar experiments with ducks, the plasma from each of a series of adult ducks was tested for its effect on the course of infection in young ducklings. The adult

ducks were then inoculated with a large dose of parasites. There was a positive correlation between the effectiveness of a plasma in lessening the parasitemia of ducklings treated with it and the resistance on infection exhibited by the duck from which the plasma had been obtained. More than half of the adult female ducks with an active ovary which were tested, but only one of the males, had effective plasmas and also showed relative resistance to the infection.

**LOMAKIN, D. P. (1947.) [Equine babesia infection with concurrent infectious anaemia.]—*Veterinariya, Moscow.* 24. No. 2. pp. 13-15.**

2243

L. states that the two infections can run concurrently without babesiasis being necessarily apparent because, first, the clinical symptoms of it are absent in carriers and, secondly, babesia may temporarily disappear from the peripheral bloodstream when infectious anaemia supervenes.

The interrelationship and differential diagnosis are discussed and three case histories are described.—F.A.A.

**WIIDIK, R. W. (1948.) Beitrag zur Aethiologie und Behandlung der Rinderpiroplasmose in Finnland; ein neuer Erreger der Rinderpiroplasmose in Finnland—*Françaiella caucasica*. [Bovine piroplasmosis. *Françaiella caucasica*—a new cause of piroplasmosis in Finland.] — *Suom. Eläinlääkaril.* 54. 136-144. [In German.]**

2244

The author records for the first time in Finland the presence of *Françaiella caucasica* infection in cattle. Of 54 cases of bovine piroplasmosis examined in one district in 1945, 9 were caused by this parasite and the remainder by *B. bovis* infection. The two types were indistinguishable on clinical grounds, jaundice being well marked in both.

There is no information about the distribution of *Françaiella* infection in Finland, but the vector is probably *Ixodes ricinus*, which was found on the animals in question. The piroplasm was strongly haemolytic and seemed to cause a greater mortality in cattle than *B. bovis*. Infection by the latter gave no immunity to *F. caucasica*. It is possible that the two infections may occur simultaneously in the same animal.

—I. W. JENNINGS.

RAMON, L. (1948.) Remarques sur la virulence naturelle de *Theileria dispar*. Essais de traitement de la theilériose bovine par la "Lomidine." [The pathogenicity of *Theileria dispar* and treatment with "lomidine."]—Arch. Inst. Pasteur Alger. 26. 386-390. **2245**

Certain strains of *Theileria dispar*, e.g., that of Jacquot, are very virulent, while others (Kouba and Brunette) are less so.

When theileriasis appears late in the year (July) the protozoan appears to have become attenuated in the tick vector and so the condition is less severe than an outbreak in May.

See also abst. 2307 (*T. equiperdum*); 2434 (in Peru); 2468

Lomidine, a derivative of 4, 4'-diamino-diphenoxypentane, was used in six cases and while it is not a specific remedy, it reduces the temperature and so decreases the severity of the disease.—J. G. O'S.

FARLEY, H., PEARSON, C. C., FOOTE, L. E., & KLIWER, I. O. (1949.) The use of two antimalarial substances in the treatment of anaplasmosis.—Amer. J. vet. Res. 10. 214-216. **2246**

In cattle in Oklahoma affected with anaplasmosis the authors report a definite therapeutic response following the administration of paludrine hydrochloride and quinoline diphosphate.—D. LUKE.

(report, Gold Coast Colony); 2469 (report, Sierra Leone).

### DISEASES CAUSED BY VIRUSES AND RICKETTSIA

MCLAUCHLAN, J. D., & HENDERSON, W. M. (1947.) The occurrence of foot-and-mouth disease in the hedgehog under natural conditions.—J. Hyg., Camb. 45. 474-479. **2247**

During a series of outbreaks of F. & M. disease on farms in Norfolk a number of hedgehogs, *Erinaceus europaeus*, were found affected with the disease. The fact that the hedgehog is susceptible to the disease and can readily be infected experimentally is well known, but this is the first record of the finding of naturally infected hedgehogs with the specific lesions of the disease. The history of these outbreaks is given. The first infected hedgehog was noticed by a veterinary inspector because it looked sick; on examination it had vesicles on the feet. Its carcass was sent to the laboratory and virus was isolated from the lesions, the heart blood and the bone marrow. The following day a dead hedgehog with old lesions was found outside the buildings on one of the farms. Trapping and hunting of hedgehogs was instituted and in all between 6th July and 23rd Sept. 56 hedgehogs were examined. Lesions were found on the tongue, snout and feet of nine of these and virus was isolated from five. The virus strains were all of the same immunological type as the strain causing the outbreaks in cattle, namely Vallée 0. The features of the disease in hedgehogs are described and the possible role of these animals in the spread of infection is discussed. In this series of outbreaks the

evidence suggested that hedgehogs were responsible in some instances for spreading the disease to cattle.—M.C.

TSION, P. A., & RAEVSKI, A. A. (1947.) A disease of cattle, simulating F. & M. disease.] — Veterinariya, Moscow. 24. No. 2. pp. 18-20. **2248**

Immediately after and following the path of a hurricane, an outbreak among cattle spread in a fortnight over a very wide area, and was reported to resemble F. & M. disease. The chief symptoms were: body temperature 39.6-41.4°C.; pulse 70-90; respiration 70-80; a spasmodic cough; nasal mucous membrane slightly hyperæmic, exuding a semi-clear mucus; 20-30% of cases also dribbled a clear, foamy, non-sticky saliva, but no lesions in the mouth were found; blinking, lachrymation and red conjunctiva; cattle mainly rested, as movement appeared to be difficult and gait was unsteady, though there was no actual lameness; pressure on the lumbar region caused the animal to sink down. The incubation period apparently lasted two days, the onslaught was sudden and animals recovered after one to six days, the younger ones sooner.

The authors concluded from their clinical, pathological and laboratory investigations that this infectious but non-fatal outbreak was caused by a virus of unknown origin. They discuss the course of the disease and the differential diagnosis between it and F. & M. disease, rinderpest, bovine

malignant catarrh and dengue or three-day sickness.—F.A.A.

MULLICK, D. N. (1949.) Panting in cattle—a sequel to foot-and-mouth disease. II.

Biochemical observations.—*Amer. J. vet. Res.* **10.** 49-55. **2249**

I. The clinical features and pathology are described following a study of 23 cows, 20 of which were crosses between European (mostly Friesian) and Zebu breeds and three were pure Zebu (Hariana). This condition is well known in India and other tropical areas where foot and mouth disease exists. It occurs as a sequel to F. & M. disease. An outstanding feature of the pathology was the reduction in size of the thyroid glands, the small size of the vesicles and the reduced storage of colloid. It is suggested that two factors are involved in causation, namely a chronic anaemia and a disturbance of the pituitary-thyroid-adrenal mechanism, both caused initially by the F. & M. disease virus.

II. Biochemical observations made over a period of four years on the 20 cross-bred cows mentioned in the previous abstract are described. The results suggest that the anaemia in these cattle is microcytic and that the animals also have acidosis.

—M.C.

SCHMIDT, S., & HOLM, P. (1949.) Vaccination af kvaeg mod mund-og klovesyge med vacciner af forskellige sammensætninger og i forskellige doser. [Vaccination of cattle against foot-and-mouth disease with vaccines of various composition in various doses.]—*Maanedsskr. Dyrlæger.* **60.** 365-381. [English summary modified.] **2250**

Tests of the effects of different doses of vaccine show that 7 ml. of vaccine is too small a dose to procure a sufficiently solid immunity. With 15 ml., good immunity is obtained ten days after vaccination. Increasing the dose to 60 ml. does not give much better results.

Two doses of 15 ml., each given at an interval of two weeks, gives a slightly better immunity than one of 15 ml. Vaccination with one dose of 15 ml. has the effect that the immunity is more durable than when the same vaccine is given in two doses of 15 ml. after preliminary dilution from 1:4 to 0:4 per cent.

Revaccination with doses as small as

12.5 ml. at a time when the immunity from the primary vaccination is subsiding rapidly or is not demonstrable by test, leads to a prompt increase in the resistance of the animals to the original level.

Therefore it is advisable every year to revaccinate the cattle with e.g. 10-15 ml. vaccine. This will provide a good protection against possible F. & M. infection in the herds.

Comparative tests made with vaccine containing varying quantities of aluminium hydroxide have given results showing only slight differences. Small quantities of vaccine give an immunity just as good and just as durable as the same quantities with a larger quantity of aluminium hydroxide whereby the volume was increased by up to 12 times.

A small experiment with calves showed that the immunity in such young animals is less durable than in cows. Six months after vaccination the calves had little immunity. As with cows, their immunity could be stimulated by revaccination with a small dose of vaccine, but the results were not so regular as in the case of cows.

When repeating the vaccination of calves it is therefore advisable to give the same quantity of vaccine as at the original vaccination.

Adsorbates prepared from active F. & M. disease virus and aluminium hydroxide and then kept at refrigerator temperature until they had become non-toxic [sic] (about 12 months) proved to be still active after five and a half years. Vaccines of this kind are therefore much more durable than those prepared in the usual manner. Indeed, one of the adsorbates contained only a fifth of the quantity of aluminium hydroxide employed in practice.

HANSEN, A., SCHMIDT, S., & HOLM, P. (1949.) Immunisation du cobaye au moyen d'une suspension de virus aphéteux adsorbé par l'hydroxyde d'aluminium et irradié par des ondes ultra-violettes (ultra-courtes). [Immunization of g. pigs with a suspension of foot-and-mouth disease virus adsorbed on aluminium hydroxide and treated with ultra-violet rays.]—*C. R. Acad. Sci., Paris.* **228.** 281-282. **2251**

Adsorbed virus inactivated by exposure to ultra-violet light was found to be effective

as an immunizing agent in the g. pig.  
—H. H. SKINNER.

MICHELSSEN, E. (1950.) Experiences concerning the value of the complement fixation method for differentiation of virus types and type variants of foot-and-mouth disease.—*Acta. path. microbiol. scand.* 27. 172-180. [In English. Author's summary slightly modified.] **2252**

A survey is given of the results gained from about 200 type determinations of virus of foot-and-mouth disease using complement fixation. In all the cases this method has given such distinct results that it may be considered far superior to the methods previously used: inoculation tests on guinea-pigs with known immunity. Description is given of a number of experiments aiming at a mutual antigenic placing of three A variants by means of spectrophotometric measuring. A complex type variant is described. Its antigenic structure appears to be inconstant.

JOHNSON, H. N. (1948.) Methods of rabies control.—*Proc. 4th Internat. Congr. Trop. Med. Malar.* pp. 587-600. **2253**

J. discussed rabies under two epidemiological types, namely the natural disease occurring in wild animals and the urban type maintained in dogs. The history of rabies in wild animals in Europe, S. Africa, Mexico, S. America, the West Indies and in the U.S.A. was briefly described. The possible existence of reservoirs of infection in types of nocturnal animals seldom seen by man was discussed. The methods of control of urban rabies were then considered.

In the discussion, Galloway gave details of long incubation periods in dogs undergoing quarantine in Great Britain. Rossi spoke of different antigenic types of virus in Venezuela. Daubney mentioned the role of the jackal in East Africa. Hammon gave information on the possible value of immune serum in treatment.—M.C.

JANSEN, J. (1949.) Vaccinia (Runderpokken) bij rund en mensch. [Cow pox in cattle and man.] — *Tijdschr. Diergeneesk.* 74. 897-901. [Abst. from English summary.] **2254**

In the Netherlands cow pox sometimes occurs. Many cases were seen in 1949. The

milkers almost always become infected. These infections are occasionally rather serious; one mortal case (encephalitis) occurred. It may be wondered if the numerous cases of cow pox and the infections of milkers resulting from them might have been caused by the numerous prophylactic vaccinations recently carried out in human beings (infection of the cow by a vaccinated person).

The author advises prophylactic vaccination of all cattle on a farm as soon as a case of cow pox occurs, segregation of the diseased cow, and boiling of milk for calves. Milking must be done either by machine or by vaccinated persons. The wearing of rubber gloves during milking also affords protection. Pasteurization will be a sufficient process for the milk destined for dairies.

Vaccinated persons should not be allowed to come into contact with cows until the lesions have healed.

DEKKING, F. (1950.) Koeppokken en vaccinia. [Cow pox and vaccinia.] — *Tijdschr. Diergeneesk.* 75. 248-249. [English summary copied verbatim.] **2255**

Four strains of cow-pox, isolated during the present epidemic, proved to be typical cow-pox strains according to most of Downie's standards. On the other hand, cases of cow-pox in herds are definitely known to have occurred recently following human vaccination; giving rise to the opinion in certain quarters that all clinical cow-pox is caused by vaccinia virus.

Veterinarians are requested to help solve this old controversy by sending material to the author.

MITSCHERLICH, E. (1949.) Ein Trockenimpfstoff gegen Schafpocken. [A dry vaccine against sheep pox.] — *Mh. Vet.-med.* 4. 121-127. **2256**

In Yugoslavia sheep are protected against sheep pox by use of a vaccine made from sheep-pox material. The vaccine, preserved in 3% boric acid, deteriorates rapidly in the summer heat. Experiments in drying the vaccine material show that it will retain its efficiency for a much longer period if it is dried over calcium chloride and preserved *in vacuo* either in small sealed glass tubes, or in large flasks with rubber stop-

pers for field work.—I. W. JENNINGS.

JONES, T. C., GLEISER, C. A., MAURER, F. D., HALE, M. W., & ROBY, T. O. (1948.) **Transmission and immunization studies on equine influenza.**—*Amer. J. vet. Res.* **9.** 243-253. **2257**

This is a condensed report on much research carried out during eight years ending in 1947, upon equine influenza at the American Army Veterinary Research Laboratory. The virus infection could not be set up in any of ten species of laboratory animals, so young horses had to be used.

The virus could be preserved in infected tissue kept in dry ice-alcohol at about  $-70^{\circ}\text{C}.$ , for as long as 265 days and it could be sustained through 22 passages in horses. No success was obtained in attempts to grow the virus in chick embryos or in tissue culture.

The experimental pure virus infection was set up by intranasal instillation or intravenous injection of infective material, the best source being spleen tissue, and infected horses reacted within 3-10 days or longer with fever and rhinitis. As the animals had to be killed within a few days in order to recover the virus there was no opportunity to study the disease to its natural termination.

In immunity experiments, it was found that nearly all the full-grown horses examined were immune to artificial infection. Bacterins prepared from streptococci isolated from fatal cases of equine influenzal pneumonia and killed virus suspensions were both inactive as immunizing agents, but live virus obtained during serial passage appeared to have some immunizing power: this, however, could not be given adequate trial as the experimental horses were sold by the army and subsequent information, of unsatisfactory quality, could only be obtained from the horses' new owners. Eight horses vaccinated as yearlings and retained by the army were challenged a year later: five had absolutely no reaction and three reacted very mildly.—J.E.

YOUNG, G. A., JR., & UNDERDAHL, N. R. (1950.) **Swine influenza as a possible factor in suckling pig mortalities. III. Effect of live virus vaccination of the dam against swine influenza on suckling pig mortalities.**—*Cornell. Vet.* **40.** 24-33. **2258**

Observations were made on 159 litters of pigs, the dams of which had been vaccinated with swine influenza vaccine. There was a lower mortality in litters from sows vaccinated before conception than in control litters, whereas when dams were vaccinated during gestation, mortality in their litters was higher than in control litters. The possible implication of these findings is discussed.—D. LUKE.

WAGNER, R. R., & BENNETT, I. L. (1950.) **The production of fever by influenzal viruses. III. Effect of receptor-destroying substances.**—*J. exp. Med.* **91.** 135-145. [Authors' summary copied verbatim.] **2259**

The effect of treating rabbits with materials which destroy the cell receptors for influenzal viruses upon the ability of these animals to respond with fever to injection of the PR8 and Lee strains of influenza virus and Newcastle disease virus (NDV) is described. In general, both cholera vibrio and *Cl. welchii* filtrates produced diminution of febrile responses. The effect of sodium periodate upon the pyrogenic reaction was not significant.

Near-lethal amounts of these materials were necessary to demonstrate their protective effects against virus challenge. In order to rule out general debility as a factor in lessening the fever, it was shown that the ability of animals to respond to the pyrogenic effect of typhoid vaccine was unimpaired by injection of receptor-destroying substances.

The substances tested were more effective in abolishing the febrile response to PR8 virus than to Lee virus or NDV. This finding is compatible with previous studies of the protective effect exerted by homologous and heterologous viruses.

These findings give support to the hypothesis that union of virus and host receptor substance plays a part in the production of fever by these viruses.

GOTTSCHALK, A., & LIND, P. E. (1949.) **Ovomucin, a substrate for the enzyme of influenza virus. I. Ovomucin as an inhibitor of haemagglutination by heated Lee virus.**—*Brit. J. exp. Path.* **30.** 85-92. **2260**

Ovomucin is the only protein in egg-white which inhibits haemagglutination by

heated type B (Lee) influenza virus. This inhibitory power is a property of a small portion only of ovomucin. The lysozyme content of ovomucin can partly be made to crystallize out. The inhibitory power is reduced by active influenza types A and B, by the receptor-destroying enzyme of *Vibrio cholerae*, and by trypsin. NaCl in 5% concentration markedly inhibits the reduction by active influenza virus of the inhibitory power.—W. R. BETT.

BLUMENTHAL, H. T., GREIFF, D., PINKERTON, H., & DE WITT, R. (1950.) **Influenza. I. The hemagglutination and infectivity titre curves of PR8 influenza virus cultivated in embryonated eggs at different temperatures.**—*J. exp. Med.* **91**. 321-329. [Authors' summary copied verbatim.]

2261

PINKERTON, H., GREIFF, D., BLUMENTHAL, H. T., & HENSLEY, R. (1950.) **Influenza. II. Effect of influenza virus multiplication on the oxygen consumption curves of embryonated eggs incubated at different temperatures.**—*Ibid.* 331-334. [Authors' conclusions copied verbatim.]

2262

GREIFF, D., BLUMENTHAL, H. T., & PINKERTON, H. (1950.) **Influenza. III. Rapid alterations in the respiratory rate of embryonated eggs apparently caused by influenza virus toxin.**—*Ibid.* 335-339. [Authors' summary copied verbatim.]

2263

I. Groups of embryonated eggs infected with the PR8 strain of influenza virus A were incubated at 34°, 37.5°, and 40°C. At frequent intervals, for periods ranging up to 96 hours, pooled allantoic fluids were tested simultaneously for infectivity and hemagglutination. After about 12 hours of virus growth, fluids often showed infectivity titres greater than 10-5, but were incapable of causing hemagglutination. At later time intervals, marked disagreement between the two tests for viral activity was noted at all temperatures, but most strikingly at 40°C. Hemagglutination titres were highest and best sustained in eggs incubated at 34°C., while incubation at 37.5°C. resulted in the highest and best sustained infectivity titres. Hemagglutination titre determinations do not reflect accurately the rate of influenza virus multiplication.

II. In addition to the cycles of growth

shown by the influenza A virus during the first 24 hours of its residence in the fertile egg, cycles separated by longer time intervals have been noted between the 24th and 96th hours. These longer cycles are best seen when the eggs are incubated at 40°C. Corresponding fairly accurately with these cycles of growth of the virus, wide cyclic variations in the rates of increase in oxygen consumption of the infected eggs have been found to occur. These variations are in striking contrast to the uniformity of increase noted in uninfected eggs. The variations in infectivity may be caused by periodic interference with virus multiplication by inactive virus particles. The variations in oxygen consumption probably are correlated with variations in the concentration of virus toxins.

III. Allantoic fluid from embryonated eggs infected with influenza A virus contains a toxic agent which can be demonstrated and quantitatively measured by its rapid effect on oxygen consumption when it is introduced in new series of fertile eggs. The effects were measured 90 minutes after the injection of the infected fluid, and were seen following both intra-allantoic injection and injection into the yolk sac. This toxin, in concentrations resulting from the injections of 0.5 cc. or less of the infected fluid, has no effect on oxygen consumption. The injection of 0.75 to 2.0 cc. of the fluid strikingly increases the oxygen consumption of the fertile eggs, while the injection of 3.0 cc. markedly depresses respiration. A similar reversal and eventual loss of the effect of the toxin on respiration were noted when the concentration of toxin was progressively diminished by heat inactivation. The toxic agent is slowly inactivated by heating at 56°C., but is effective long after infectivity and hemagglutinating ability have been destroyed. In this respect the agent differs from rickettsial and lymphogranuloma venereum virus toxins. The method described may be of value in studying the physiological effects of other toxic agents.

HOYLE, L. (1948.) **The growth cycle of influenza virus A. A study of the relations between virus, soluble antigen and host cell in fertile eggs inoculated with influenza virus.**—*Brit. J. exp. Path.* **29**. 390-399.

2264

This study was undertaken with the D.S.P. strain of influenza virus A, isolated from man by egg inoculation in 1943 and maintained by passage in the allantoic sac. Growth occurs in a series of intracellular cycles. The infective, erythrocyte-agglutinating virus is taken up by the allantoic-sac lining and is converted into a non-infective, non-agglutinating, intracellular form. After six hours' multiplication, the infective form reappears and is excreted into the allantoic fluid; the cycle is repeated. In the earliest stages of growth soluble antigen is produced in the chorio-allantoic membrane—possibly identical with the intracellular phase of the virus.—W. R. BETT.

ECKERT, E. A., LANNI, F., BEARD, D., & BEARD, J. W. (1949.) Effect of swine influenza virus on the viscosity of the egg-white inhibitor of hemagglutination.—*Science*. 109. 463-464. 2265

Egg white contains a substance capable of combining with influenza virus and inhibiting agglutination of virus with red blood corpuscles. Virus has a profound effect on the viscosity of semi-purified egg white inhibitor solutions. An enzymatic hypothesis of virus function most reasonably explains at the present time virus-induced viscosity reduction of purified inhibitor solutions.—W. R. BETT.

I. HIRST, G. K. (1950.) Receptor destruction by viruses of the mumps-NDV-influenza group.—*J. exp. Med.* 91. 161-175. [Author's summary copied verbatim.] 2266

II. HIRST, G. K. (1950.) The relationship of the receptors of a new strain of virus to those of the mumps NDV-influenza group.—*Ibid.* 177-184. [Author's summary copied verbatim.] 2267

I. A strain each of mumps and Newcastle disease virus and five strains of influenza virus were found to be capable of removing all the receptors for this group of viruses from fowl red cells. Five virus strains were tested for their capacity to inactivate the virus hemagglutinin of human plasma and of egg white. In the case of egg white all strains, including mumps and Newcastle disease virus inactivated the inhibitor completely, or nearly so. With plasma the influenza strains inactivated the inhibitor completely, but mumps and NDV

destroyed only that portion of the complex which effected mumps inhibition. The inhibitor for some strains was destroyed more rapidly than that for others and the sequence in which they were destroyed (inhibitor gradient) was similar, regardless of the strain employed. The inhibitor gradient for egg white was very different from that for plasma and these in turn differed significantly from the receptor gradient for fowl red cells.

II. The interrelationships of the cellular receptors and the hemagglutinin inhibitors of a new strain of virus (1233) to members of the mumps-Newcastle disease-influenza group have been investigated. It was found that strain 1233 does not destroy the receptors or inhibitors of the other group, nor does the latter destroy 1233 receptors or inhibitor. The sole exception to this statement was a moderate destruction of 1233 inhibitor in egg white by Newcastle disease virus. The classification of strain 1233 was discussed in the light of this evidence, evidence which tends to place strain 1233 in a different category from that of any other strain of the MNI group.

CHU, L. W., & MORGAN, H. R. (1950.) Studies of the hemolysis of red blood cells by mumps virus. I. The development of mumps virus hemolysin and its inactivation by certain physical and chemical agents.—*J. exp. Med.* 91. 393-402. [Authors' summary copied verbatim.] 2268

CHU, L. W., & MORGAN, H. R. (1950.) Studies of the hemolysis of red blood cells by mumps virus. II. The relationship of hemagglutination, virus elution, and hemolysis.—*Ibid.* 403-416. [Authors' summary slightly amended.] 2269

I. The conditions for the production of extra-embryonic fluids with hemolytic activity from chick embryos infected with mumps virus have been investigated. Infected fluids with strong hemolytic activity can be obtained by harvesting the fluids of 6- to 8-day-old chick embryos inoculated by the amniotic route after 5 to 6 days' incubation at 35°C. Under such circumstances, the hemolytic capacity of amniotic fluids is usually much higher than that of the allantoic fluids. The hemolytic activity and infectivity of the virus have been found

to be reduced or destroyed by heat, formaldehyde, and ultraviolet irradiation under conditions which leave the hemagglutinating capacity practically unchanged. Ultraviolet irradiation appeared to have a greater deleterious effect on the infectivity of the virus than on its hemolytic capacity. The marked reduction or destruction of hemolytic activity of the virus produced by certain treatments with these various agencies was not accompanied by loss of the ability of the virus to elute following its adsorption on red blood cells during the process of hemagglutination. This test for hemolytic activity, which measures a more labile property of the virus than do determinations of virus hemagglutination or virus elution, may be useful in detecting changes which occur early during degradation of the virus.

II. The relationship between hemagglutination and hemolysis by the mumps virus has been studied under conditions which affect (a) the receptors of fowl red cells and (b) the adsorption and subsequent elution of the virus from these cells. The results show that the hemolytic action of the virus appears to involve some of the same receptor areas of erythrocytes that are implicated in hemagglutination. Materials such as allantoic fluid, egg white, and red cell extract, which inhibit the agglutination of fowl red cells by mumps virus, also interfere with its hemolytic activity. Of these inhibitors, egg white and red cell extract, which are readily destroyed by the virus during incubation at 37°C., exert a greater antagonistic effect on hemagglutination than on hemolysis. Heated mumps virus or unheated influenza virus interferes with the hemolysis of red cells by untreated mumps virus. Though hemolysis takes place during elution of the virus after its adsorption on the red cell, the processes are apparently distinct. The hemolytic activity is easily affected by certain conditions of pH and temperature which have no effect on the ability of mumps virus to adsorb on and elute from red cells.

STEIN, C. D., & GATES, D. W. (1950.) The neutralizing effect of antiserum from recovered carriers of equine infectious anemia on the virus of the disease.—*Vet. Med.* 45. 152-56. [Authors' summary copied verbatim.] **2270**

Studies indicate that neutralization of the virus of equine infections anemia by antisera from a recovered carrier originally infected with Wyoming virus occurred when mixtures of virus and antiserum in proportions of 1 to 10 were held two or three hours at 30°C., or when mixtures in proportions of 1 to 39 were held 24 hours at 30°C.

However, with antisera from the same source, neutralization of the virus did not occur when the ratio of the virus-antiserum mixture was 1 to 2, nor did it occur when antisera had been held in storage for long periods before use, indicating a decrease of specific antibody content with age.

The failure to neutralize strains of Wyoming and New Hampshire virus with fresh antisera from a recovered carrier originally infected with California virus suggested the absence of specific antibodies in the serum of the carrier or possibly some immunologic difference in these three strains of virus.

Normal horse serum failed to inhibit the action of the virus when mixtures of such serum and virus in proportion of 1 to 10 or 1 to 39 were injected into susceptible horses.

WILDE, J. K. H. (1948.) Rinderpest in some African wild mammals.—*J. Comp. Path.* 58. 64-72. **2271**

Experiments on certain wild animals which had first been tamed and thoroughly accustomed to being handled and to having their temperatures taken are described. A reedbuck (*Redunca redunca*) was infected by subcutaneous injection of virulent blood from an ox and died of rinderpest; the P.M. appearances are described. Blood from the infected reedbuck was injected into susceptible oxen and into porcupines (*Hystrix galeata*). The oxen developed rinderpest. Porcupines were also injected with virulent blood from oxen and did not develop rinderpest. Bush pig (*Potamocerus* spp.) were inoculated with virulent blood from an ox. They developed a thermal reaction and mild clinical symptoms but recovered. A healthy bush pig placed in contact with the inoculated ones developed rinderpest and died. In all, five bush pigs were infected, of which two died.—M.C.

MORNET, P. (1948.) Schema epizootologique de la peste bovine en Afrique

Occidentale Française. [Epidemiology of rinderpest in French West Africa.] — *Bull. Serv. Elev. Industr. anim. A.O.F.* 1. Nos. 2-3. pp. 7-12. 2272

The epidemiology in French West Africa and the adjoining territories, Sierre Leone, Liberia, the Gold Coast and Nigeria as influenced by trade routes and by seasonal movements of cattle is described and illustrated by maps. Varying degrees of resistance to rinderpest are found in cattle in different areas. This variation is not, in Moronet's opinion, a racial characteristic, but depends on past experience or otherwise of the disease.—M.C.

EDWARDS, J. T. (1949.) The uses and limitations of the caprinized virus in the control of rinderpest (cattle plague) among British and near-eastern cattle. — *Brit. Vet. J.* 105. 209-253. 2273

This article reviews historically the progress of rinderpest control in India, gives a good account of the work done in Burma in the years prior to the war as a result of which rinderpest had been practically eradicated, describes a campaign against the disease in Egypt and refers to some experiences when working with several strains of virus in Britain. Interesting reference is made to the different immunological types of cattle throughout the world and of their varied reactions to field and attenuated strains of rinderpest virus. A close similarity is apparent between rinderpest virus and the virus which is associated with canine distemper. The author considers that in the control of rinderpest in the field, a bovine population with a high threshold of natural resistance needs to have its "herd immunity status" raised until it contains approximately 40% of permanently immune animals in order to attain freedom from epidemic disease. For the disease to lose its endemic character, 60% of the population must be permanently immune.

[This article reports in interesting detail the observations of a field and laboratory worker of wide experience and it must be concluded that much yet remains to be known of the fundamental problems of immunity to rinderpest. In view of the great variability of resistance shown by the different races of cattle and in view of the apparent variability of the current strains of rinderpest virus, total eradication, which is

the avowed intention of many Colonial Territories, will be difficult to achieve. This is particularly evident in view of the known failure successfully to immunize young stock which may act as a reservoir of infection in immunized herds. As E. suggests, the disease can be controlled effectively only in those countries which have an adequate veterinary organization and until it is possible to legislate against the movement of diseased stock vaccination and inoculation alone will not eliminate the disease.]

—S. BRIAN KENDALL.

SISSEKO, M. (1948.) Nouvelles observations sur l'emploi du virus capripeste chez les veaux n'dama. [Immunization of calves with rinderpest goat virus.] — *Bull. Serv. Elev. Industr. anim. A.O.F.* 1. Nos. 2-3. pp. 13-15. 2274

Goat-adapted rinderpest virus can be transmitted from calf to calf and from calf to goat by inoculation. Calves previously vaccinated with a formolized vaccine have an inapparent reaction when subsequently inoculated with goat-virus and develop a solid immunity. Serum may be injected along with goat virus to protect calves from too severe reactions.—M.C.

HUDSON, J. R. (1949.) Les epididymites contagieuses des animaux domestiques et la valeur de l'insemination artificielle dans la lutte contre l'epididymite au Kenya. [Contagious epididymitis and vaginitis in Kenya and the influence of artificial insemination in its control.] — *Bull. Off. internat. Epiz.* 32. 170-176. 2275

An infectious disease of cattle in East Africa characterized by epididymitis in the bull and vaginitis in the cow is described. The indigenous cattle appear to be resistant carriers of infection. The disease is responsible for a high incidence of sterility in bulls of European breeds used for grading-up the local cattle and is one of the most serious obstacles to the development of the dairy industry in Kenya. Diagnosis in cows presents difficulties, but the lesion in the epididymis of the bull is very characteristic. It consists of induration and enlargement without pus formation. The casual agent has not yet been identified, but is possibly a virus. The most practicable method of control is by the use of artificial insemination

in place of natural service and this method is very widely used in Kenya.—M.C.

HENNING, M. W. (1949.) **Infectious or epizootic infertility of cattle. Infectious bovine cervico-vaginitis and epididymitis.** —*J. S. Afr. vet. med. Ass.* **20.** 9-15. **2276**

An account based on the work of Daubney & Hudson of the disease as it occurs in Kenya with a footnote to the effect that this disease has now been diagnosed in the Union of S. Africa.—M.C.

EDWARD, D. G. ff. (1947.) **Methods for investigating immunization against louping-ill.** —*Brit. J. exp. Path.* **28.** 368-376. **2277**

E. describes experiments which tend to show that the susceptibility of the central nervous system of the sheep to attack by louping-ill virus varies with the season, being least in summer and greatest under severe winter conditions.

Formolized vaccine made from mouse brain protects both mice and sheep, but sheep tissue vaccine, while protecting sheep was less effective in protecting mice.

The production of brain trauma in sheep, by the intracranial injection of sterile starch, was found to increase the susceptibility of the central nervous system to virus injected subcutaneously.

—ANGUS FOGGIE.

EDWARD, D. G. ff. (1947.) **Culture of louping ill virus in the embryonated egg.** —*Brit. J. exp. Path.* **28.** 237-247. **2278**

Louping-ill virus was propagated in the developing hen's egg by inoculating into the yolk sac or into the embryo. The titre of virus recovered varied from  $10^{-5}$  to  $10^{-7.5}$ , the concentration of virus being highest in the embryo. This concentration of virus is greater than can be obtained from sheep tissue, but not as great as can be obtained from infected mouse brain. There was some evidence that the pathogenicity for sheep had been lowered by 49 passages in eggs.—ANGUS FOGGIE.

SMITHBURN, K. C., HADDOW, A. J., & GILLETT, J. D. (1948.) **Rift Valley fever. Isolation of the virus from wild mosquitoes.** —*Brit. J. exp. Path.* **29.** 107-121. **2279**

A filtrable virus was isolated six times from mosquitoes, *Eretmapodites* and *Aedes*,

caught in the Semliki Forest in Western Uganda in 1944. Immunological studies showed the six strains to be identical, and epidemiological investigations showed that the outbreak did not affect human beings, but probably some unidentified species of wild animals.—W. R. BETT.

HARNACH, R. (1950.) Pokusy o adaptaci viru Kloboukovy nemoci na kureciembrya. [Culture experiments with the virus of porcine encephalomyelitis on chick embryos.] —*Cas. ceskoslovensk. vet. 5.* 2-4. [French & Russian summaries.] **2280**

H. inoculated hens' eggs, incubated for 11 days, with 0.2 ml. of 17 filtered and unfiltered strains of Teschen disease virus, using brain tissue suspensions from infected pigs. Care was taken to use only clinically and histologically confirmed material, free from bacterial contamination. Two of the strains were from pig passages. Injections were made partly into the chorio-allantois and partly under the shell membrane of the egg. When after further incubation live chicks hatched, the experiment was at first regarded as having failed. All chicks died within eight weeks, two of them with signs of paralysis, which at the time was attributed to lack of vitamins.

In later passages more attention was paid to the hatched chicks. Five apparently normal chicks, hatched from a series of ten infected embryonated eggs, developed lameness and ataxia, after 10-14 days, although they had been given a diet rich in vitamins containing fresh grass and yeast. There was weakness, loss of balance, a tendency to fall forward and dyspnoea. All died within 28 days, i.e., within 39 days after inoculation of the embryos.

Histologically there were isolated lymphocyte infiltrations in the cerebellum, perivascular infiltrations were not observed. H. attributed dyspnoea to affection of the respiratory centre in the medulla oblongata. The lungs were free from pathological changes.

Brain suspensions from the five chicks were inoculated into 20 embryonated eggs on the tenth day of incubation and all embryos died within three days. Some of the embryos were found to be contaminated with bacteria, although every care had been taken. Suspensions from the embryos were

inoculated intranasally into a pig that had been immunized against *Erysipelothrix rhusiopathiae*. The pig remained healthy. H. states that Teschen disease does not necessarily result when strains weakened by passage are used in experimental infection.

He quotes briefly further experiments made by Brauner and Ursiny at the government veterinary institute at Ivanovice. Seven successful passages were carried out with one strain of the virus. The disease was reproduced in six piglets after inoculation with suspension of brain pulp from chick embryos. It is stated that only a very few exceptional strains are adaptable to chick embryos. Further work is being carried out.—E.G.

MOMBERG-JORGENSEN, H. - C. (1949.)  
Hvalpesygestudier I. Infection- og vaccinationforsøg paa mink. [Studies on canine distemper. I. Attempts at infection and vaccination of mink.] — *Nord. Vet.-med.* **1.** 377-387. [English summary.] **2281**

Since 1944 outbreaks of distemper on mink farms have occurred in Denmark and the problem of vaccination has become acute. In this study 290 young, healthy mink reared under farm conditions were used. There was varying success in the transmission of the infection artificially. Using a virus-containing suspension of spleen tissues and the subcutaneous route of injection, the "takes" of 142 animals averaged 91.5% (81-97.5) counting as positive all clinical cases and those in which, on P.M. examination, inclusion bodies could be demonstrated, no difference resulting whether the infective material originated from ferret or mink. The importance of using young animals is stressed.

On 148 mink three vaccines were tested, two being formalized suspensions prepared from material from ferret and mink respectively and the other a commercial American product. Their protective efficiencies in the order mentioned were statistically computed to be 86-100, 75-100 and 48-92% respectively. — GUSTAV NAERLAND.

HEINRICH, O., & KULSE, A. (1949.)  
"Staupan" ein neuer, spezifisch gegen das Staupe-Virus wirksamer Arzneikörper. [The action of an *Actinomyces* anti-

biotic in dog distemper.] — *Tierärztl. Umsch.* **4.** 165-166. **2282**

"Staupan" is an antibiotic prepared by a secret process from a species of *Actinomyces*. It is claimed to be a specific remedy for dog distemper when used alone or with penicillin.—J.E.

GROULADE, P. (1948.) Le traitement de la maladie de Carré par le virus adsorbé sur hydroxyde d'alumine et desséché. [Adsorbate distemper vaccine.] — *Bull. Acad. vét. Fr.* **21.** 369-370. **2283**

The use of an aluminium hydroxide adsorbed vaccine in treatment of 65 clinical cases is described. One injection of 40 mg. of virus was given subcutaneously.

Good results are claimed in many of the cases, especially in cases where the temperature at the time of injection did not exceed 104° F. and where secondary infection was not present.—M.C.

MANTOVANI, A. (1949.) Sulle meningoencefalomieltiti del cane. [Canine meningo-encephalomyelitis.] — *Zooprofilassi.* **4.** No. 6. pp. 17-24. **2284**

This is a discussion of the question of whether a specific virus causing encephalitis in dogs and distinct from the canine distemper virus does or does not exist. M. is of opinion that the position might be clarified by an extended use of the complement-fixation test.—M.C.

BURKHART, R. L., POPPENSIEK, G. C., & ZINK, A. (1950.) A study of canine encephalitis, with special reference to clinical, bacteriological and postmortem findings. — *Vet. Med.* **45.** 157-162. [Authors' summary slightly modified.] **2285**

Twenty-two cases of clinically diagnosed canine encephalitis were studied. In this report, only clinical history, bacteriology and gross pathology are described in detail. Reference is made to the work on virology and histopathology by Koprowski and his associates [in press]. The following may be stated as salient points: (1) The clinical histories fall into four distinct patterns. The disease seems to predominate in dogs up to one year of age. (2) Bacterial isolates could only be considered to be of secondary importance. (3) The data on gross pathology were not diagnos-

tically significant. (4) A virus was isolated which could not be differentiated from distemper in ferrets, and only caused neurological symptoms in pups. (5) Irregular demyelination of the central nervous system was the predominant histopathologic feature.

DEUBLER, M. J. (1949.) **Feline infectious enteritis.** — *Vet. Ext. Quart. Univ. Pa.* **49.** 39-44. **2286**

After describing the clinical features of infectious gastro-enteritis and infectious panleucopenia, D. refers to experiments in the passage of panleukopenia virus through kittens. The infection was most easily transmitted by giving chopped or filtered intestine by the mouth. Intraperitoneal injection of liver-spleen suspension failed to infect susceptible kittens. The indications were that the greatest concentration of virus is in the intestinal tract, at the early stage of the disease, when the temperature has started to rise.—I. W. JENNINGS.

HARFORD, C. G., & HARA, M. (1950.) **Pulmonary edema in influenzal pneumonia of the mouse and the relation of fluid in the lung to the inception of pneumococcal pneumonia.** — *J. exp. Med.* **91.** 245-260. [Authors' summary copied verbatim.] **2287**

Pulmonary edema is a component of the fully developed influenza viral lesion in the mouse. Mice with experimental pulmonary fluid have an increased susceptibility to inhaled pneumococci and under these circumstances the organisms grow in the lung and produce the lesion of bacterial pneumonia. The presence of pulmonary edema in the lesion due to the influenza virus in the lung of the mouse appears to account adequately for the previous observation that inhaled pneumococci grow in the influenza viral lesion. Mice dying of pneumococcal septicemia after inhaling fine droplets containing this organism do not have pneumonia.

The delay in migration of polymorphonuclear leucocytes into the lung after injection of pneumococci suspended in serum is an important factor in susceptibility to infection since it allows ample time for pneumococci to grow in the pulmonary fluid. The slow phagocytic action of pulmonary macrophages likewise permits growth of pneumococci.

Conditions in human beings that are known to be complicated by pulmonary edema are also known to be associated with increased susceptibility to secondary bacterial pneumonia.

WALKER, R. V. L., & POWELL, E. P. B. (1950.) **Newcastle disease. A study of the carrier problem.** — *Canad. J. comp. Med.* **14.** 61-64. **2288**

The virus was isolated from experimentally infected chickens up to 21 days after infection. It could not be demonstrated in faecal material at any time. The presence of virus could not be demonstrated in eggs laid during the post-infection period, nor chicks hatched from them. Normal hens in contact for six months with the infected group during the post-infective period remained healthy during the exposure and yielded no serological evidence of infection. Normal hens placed in contact with a cock infected six months previously developed infection after five weeks' exposure. The virus was not isolated from these birds, but neutralizing antibodies were demonstrated in their blood.—R. GWATKIN.

ZARGAR, S. L., & POMEROY, B. S. (1950.) **Isolation of Newcastle disease virus from commercial fowlpox and laryngotracheitis vaccines.** — *J. Amer. vet. med. Ass.* **116.** 304-305. [Authors' summary copied verbatim.] **2289**

Results are reported on the tests on commercial fowlpox and laryngotracheitis vaccines. Newcastle disease virus was isolated from fowlpox and laryngotracheitis vaccines. The contaminated vaccines were responsible for the introduction of Newcastle disease into several poultry and turkey flocks.

REAGAN, R. L., HICKMAN, J. W., & BRUECKNER, A. L. (1950.) **Electron micrographs of the mouse-adapted Newcastle disease virus.** — *Amer. J. vet. Res.* **11.** 231-232. [Authors' summary copied verbatim.] **2290**

Electron micrographs of saline suspended, mouse-adapted Newcastle disease virus (NDV), after being subjected to concentration in the Spinco ultracentrifuge, showed very little difference from particles observed in saline suspension of the egg-adapted NDV California strain 11,914 except for the small segments observed in

the tail. The segments of the tail seemed to show up much better without the chromium shadowing.

ELFORD, W. J., CHU, C. M., DAWSON, I. M., DUDGEON, J. A., FULTON, F., & SMILES, J. (1948.) Physical properties of the viruses of Newcastle disease, fowl plague and mumps.—*Brit. J. exp. Path.* 29. 590-599. **2291**

Investigations were carried out with the aid of the limiting infective dilution method, the erythrocyte agglutination test, and the electron microscope. The following strains were used: 'Herts' Newcastle disease virus, fowl plague Dutch strain, and Ender's strain EMA 41 mumps. New data on the physical properties—pH stability, density, and particle size—of the viruses are presented.

—W. R. BETT.

THOMPSON, C. H., & OSTEEN, O. L. (1948.) A technique for the isolation of Newcastle disease virus, using streptomycin as a bacterial inhibitor.—*Amer. J. vet. Res.* 9. 303-305. **2292**

Streptomycin at a concentration of 25 mg. per ml. of tissue suspension was used to control bacterial contamination prior to the inoculation of chick embryos for the detection of Newcastle disease virus. Filtration was not carried out. It is claimed that by this method the virus can be readily recovered free from bacterial contamination.

—D. LUKE.

JUNGHERR, E. (1949.) The pathology of experimental sinusitis of turkeys.—*Amer. J. vet. Res.* 10. 372-383. **2293**

The material examined in this report was collected during the study of two transmissible agents isolated from cases of an air sac infection (saccultis) and from an outbreak of sinusitis in turkeys. The sinusitis agent regularly produced sinusitis when inoculated into the intra-orbital sinus of adult turkeys. By the intraperitoneal route it produced an air sac infection.

Details of the histopathology of the experimental disease are recorded. A severe catarrhal inflammation was the main lesion. Both strains when inoculated into chicks parenterally or intracerebrally produced incoordination and splenomegaly. The lesions were considered to bear some resemblance to certain rickettsial infections.

—D. LUKE.

UTZ, J. P. (1948.) Effect in vitro of specific lipid fractions of animal sera on psittacosis virus.—*Proc. Soc. exp. Biol., N.Y.* 69. 186-189. **2294**

Psittacosis virus, isolated from a fatal case in a parrot ("4" strain) was propagated in the allantoic sac of eight-day-old chick embryos. Total lipid extracts were made from normal fowl, rabbit, horse, sheep and human blood. Specific lipid (lecithin-and cephalin-like) fractions of certain animal sera can inactivate psittacosis virus *in vitro*, the original sera cannot.

—W. R. BETT.

HURST, E. W. (1948.) Nitroakridin 3582: a compound possessing chemotherapeutic activity against the viruses of psittacosis and lymphogranuloma venereum.—*Brit. J. Pharmacol.* 3. 181-186. **2295**

This compound, 2, 3-dimethoxy-6-nitro-9-(3' diethylamino-2' hydroxypropyl)-amino-acridine dihydrochloride, was developed in Germany for treating rickettsial infections. The author and his colleagues used the compound against virus infections and found it to be inactive against influenza in mice, but possessing moderate activity against psittacosis and lymphogranuloma venereum. It is more active than sulphadiazine and sulphamethazine, but less active than penicillin. Relapses, however, frequently followed long courses of nitroakridin or penicillin; these compounds do not, therefore, eradicate the virus or alter its virulence.—MALCOLM WOODBINE.

LEVINE, P. P., & FABRICANT, J. (1950.) A hitherto-undescribed virus disease of ducks in North America.—*Cornell Vet.* 40. 71-86. **2296**

This condition affected ducks three days to three weeks old. Losses varied from 35-95%. Affected ducks became dull and tended to fall over on their sides and kick spasmodically. A virus was isolated which when inoculated into developing chick embryos produced retardation of growth, generalized oedema and death of the embryo.

The virus did not agglutinate red cells. The egg propagated virus was capable of reproducing the disease. Sera from ducks that had recovered gave a high degree of protection against natural infection.

—D. LUKE.

FABER, H. K., SILVERBERG, R. J., & DONG, L. (1950.) Studies on the entry and egress of poliomyelitic infection. I. Neutrotropic infection of the peripheral ganglia in apparently healthy monkeys following casual exposure.—*J. exp. Med.* **91**. 417-424. [Authors' summary copied verbatim.] **2297**

In *rhesus* and *cynomolgus* monkeys without signs or symptoms of poliomyelitis, a comparison of the incidence, numbers, size, and character of lesions in certain peripheral ganglia (gasserian, nodose, superior cervical sympathetic, and celiac) was made between 9 "new" animals sacrificed 1 to 3 days after arrival in a laboratory devoted exclusively to poliomyelitis research, and 17 "old" animals housed there without special isolation precautions for periods ranging from 17 days to 10½ months. The comparison showed that the "old" animals had more infiltrative lesions of various sizes than the "new" and that neuronophagia occurred in 65 per cent. of the "old" animals as compared with none in the "new." The heaviest and most frequent involvement occurred in the gasserian and superior cervical sympathetic ganglia, while that of the nodose (vagal afferent) ganglia was somewhat less, and that of the celiac ganglia was still less and without neuronophagia. The ganglia of the VII and IX cranial nerves were also examined and showed no lesions of note. Reasons are presented for believing that the lesions were of centripetal and not of centrifugal origin. The lesions, while not positively identified as poliomyelitic, were of similar morphology, were presumably due to an infective neutrotropic agent, and were acquired under conditions of potential exposure to poliomyelitis virus. The possibility is suggested that the asymptomatic acquisition of neutrotropic lesions in this group of casually exposed monkeys can be comparable to the acquisition of "subclinical" poliomyelitis in man.

MELNICK, J. L., LEDINKO, N., KAPLAN, A. S., & KRAFT, L. M. (1950.) Ohio strains of a virus pathogenic for infant mice (Coxsackie group). Simultaneous occurrence with poliomyelitis virus in patients with "summer gripe."—*J. exp. Med.* **91**. 185-195. [Authors' summary copied verbatim.] **2298**

Further evidence for the widespread

occurrence of Coxsackie or C virus is presented in this paper. This virus is characterized by paralysis and myositis produced in infant mice.

An epidemic of mild illnesses [in human beings] diagnosed as "non-paralytic poliomyelitis" and as "summer gripe" occurred during the summer of 1947 in Akron and Cincinnati, Ohio. From the pooled feces of such patients both poliomyelitis virus and C virus were obtained. From the samples of single patients, 3 immunologically related strains of C virus were isolated.

One patient from whom virus was isolated had an illness which was diagnosed as non-paralytic poliomyelitis (with pleocytosis). Although poliomyelitis virus could not be isolated from this patient, previous tests from similar non-paralytic patients in the same area revealed that 9 of 23 were infected with poliomyelitis virus. C virus could not be recovered from the stools of 3 of these poliomyelitis virus-infected patients.

Four patients with an illness diagnosed as "summer gripe" were tested. Two harbored poliomyelitis virus of low virulence as well as C virus, and two harbored poliomyelitis virus without any evidence of infection with C virus, either by virus isolation or by serological tests.

The patients from whom C virus was isolated developed complement-fixing antibodies 4 weeks after onset. Neutralizing antibodies appeared within the first 5 days of disease (before complement-fixing antibodies) and increased in titer during the next 3 to 4 weeks. The patients from whom C virus could not be recovered failed to develop either neutralizing or complement-fixing antibodies. Other patients in the area were infected with C virus as indicated by their serological response to the agent.

GOLD, W., & WATSON, D. W. (1950.) Studies on the bacteriophage infection cycle. I. A lytic activity assay for bacteriophages of *Clostridium madisonii*. II. Phage infection and lysis of *Clostridium madisonii*, a function of pH.—*J. Bact.* **59**. 13-16; 17-27. [Authors' summaries copied verbatim.] **2299**

I. A procedure is outlined for the estimation of relative phage concentrations from the time at which cultures of bacteria are lysed. The error of the method varies

between 18 and 64 per cent. for any one sample, but other considerations decrease the significance of the error considerably.

II. In an investigation of anomalies in the lysis of bacteria by phage, changes in acidity of the culture are shown to be responsible for the unusual results. Lysis is inhibited at pH. 5.1 and below, but not between 5.1 and 7.6. Penetration of the viruses into the cells is demonstrated to be completely blocked at pH. 5.1 and below, and at pH. 6.8 and above. At intermediate pH. values, the rate of penetration and the total yield of phage decreases as the pH approaches a limiting level. Penetration of virus into the cell is shown to be independent of its adsorption on to the cell. The enzymes involved in virus penetration, and in lysis of the infected cells, have only the acid activity limit in common, but not the basic limit, and so are considered to be different. Phage-infected cultures that do not clear because of excess acidity can be made to lyse instantaneously by neutralizing the cultures. A method for causing instantaneous lysis in uninfected cultures is described.

KILCHSPERGER, G., & WIESMANN, E. (1949.) Abortus-Epidemie bei Ziegen, bedingt durch *Rickettsia burneti*. [Infectious abortion in goats caused by *Rickettsia burneti*.]—Schweiz. Arch. Tierheilk. **91**, 553-556. **2300**

An outbreak of abortion in goats in Switzerland in 1941 was at first thought to be caused by *Brucella* infection since on microscopic examination of smears from the placenta large numbers of small pleomorphic organisms which stained red by Kösters' method were found. However, g. pigs injected with stomach contents of aborted foetuses and with placental tissues did not develop brucellosis and their blood was negative to the agglutination test. 15 blood and 11 milk samples from aborting goats were also negative for brucellosis.

The blood serum from the g. pigs was positive to the complement-fixation test using *Rickettsia burneti* antigen, as were blood serum samples from nine she goats, one male goat and two cows.

G. pigs injected with milk from aborting goats did not develop any symptoms and their blood was negative to the complement-fixation test with *R. burneti* antigen.

The authors consider that the abortions

in these goats may have been caused by *R. burneti*. No mention is made of occurrence of Q fever in people handling these goats.—M.C.

CAMINOPETROS, J. (1949.) La broncho-pneumonie épidémique hiverno - printanière, humaine et animale (chèvre, mouton), fièvre Q ou grippe des Balkans, à *Rickettsia burneti* var. *caprina*. Les caractères particuliers de l'infection animale. [Infectious broncho-pneumonia of the goat and sheep caused by *Rickettsia burneti*.]—Ann. Inst. Pasteur. **77**, 750-756. **2301**

Seasonal outbreaks of "Q" fever occurred in the winter and spring over several years in British troops in Greece; while these outbreaks were occurring in the troops only sporadic cases occurred in the local population. The seasonal nature of the outbreaks is explained as caused by infection contracted from the milk of goats, these animals being in lactation in Greece during the winter and spring. In addition to infection contracted by drinking goats' milk, C states that transfer of infection from man to man occurs, the organism being present in the sputum. Infection by sputum often results in inapparent infection recognizable only by serological tests. Attention is drawn to the fact that sheep and goats which are carriers of infection and secrete the organism in their milk frequently do not have specific antibodies in the blood. In this respect sheep and goats differ markedly from g. pigs and from man. C. is of opinion that the organism responsible for the outbreaks in man and in sheep and goats in Greece is a variety of *R. burneti* and proposes to call it *R. burneti* var *caprina*.

—M.C.

MALHERBE, W. D. (1948.) The diagnosis and treatment of rickettsiosis in dogs. — J. S. Afr. vet. med. Ass. **19**, 135-138. **2302**

The methods of diagnosis, symptoms and therapy of *Rickettsia canis* infection in use at Onderstepoort are described. Diagnosis is by examination of the monocytes in thin films of capillary blood. The characteristic temperature curve has remissions and exacerbations on alternate days, building up to a peak and then coming gradually down

to normal. After a few days' normal temperature the process starts afresh. Sulphamethazine has given best results in treatment used intravenously in dose of 0.125 g. per kg. body weight. Four injections at 24 hour intervals are given. An initial intravenous dose followed by daily administration of tablets by the mouth for four days has also proved effective.—M.C.

CROCKER, T. T., BENNETT, B. L., JACKSON, E. B., SNYDER, M. J., SMADEL, J. E., GAULD, R. L., & GORDON, M. K. (1950.) **Siberian tick typhus. Relations of the Russian strains to *Rickettsia prowazeki*.** —*Publ. Hlth. Rep., Wash.* **65.** 388-394. [Authors' summary and conclusions copied verbatim.] **2303**

Four strains of rickettsiae, supposedly the etiological agents of Siberian tick typhus, have been studied and their relation to one another and to other rickettsiae determined by means of cross-vaccination, cross-

*See also abst. 2179 (a virus in the aetiology of strangles); 2371 (demyelinating diseases); 2434 (F. and M. disease); 2468 (report, Gold Coast Colony); 2469 (report, Sierra Leone); 2476 (book, diseases of sheep).*

## IMMUNITY

RICE, C. E. (1950.) **Studies on the conglutinating complement absorption test. II. With varying amounts of complement.** *Canad. J. comp. Med.* **14.** 65-73. **2304**

Results suggested that the quantitative relationships among the various reagents were essentially similar to those previously demonstrated in the haemolytic complement-fixation tests. There are a number of antigen-antibody systems which fail to fix g. pig complement but which may fix horse complement. In these studies, only antigen-antibody systems capable of fixing both complements were used in order to determine the relative reliability of the conglutinating complement-absorption test.—R. GWATKIN.

GREENSPON, S. A., & KRAKOWER, C. A. (1950.) **Direct evidence for the antigenicity of the glomeruli in the production of nephrotoxic serums.** —*Arch. Path.* **49.** 291-297. [Authors' summary copied verbatim.] **2305**

A simple method of separating renal glomeruli from other renal components is described. They can be obtained in large numbers and with a high degree of purity.

immunity, and complement fixation tests. All four strains were found to be indistinguishable from each other and the Breinl strain of epidemic typhus. It is apparent that the cross-immunity reactions displayed by the four Siberian strains in the current tests are distinctly different from those attributed to them by the Russian investigators who themselves report divergent results. Various hypotheses might be offered to explain these differences, but such theorizing appears fruitless. Whether the Siberian strains received here bear an etiological relation to the clinical disease designated as Siberian tick typhus is uncertain. However, if they represent the causal agent of Siberian tick typhus, it is interesting to speculate on the possibility of *R. prowazeki* being maintained by a rodent-tick cycle in nature. This would leave man as only an incidental host who might, under the proper circumstances, start an epidemic of classical louse-borne typhus.

With isolated glomeruli being used as antigen, a potent nephrotoxic serum can be obtained, whereas all other cortical components of the kidney, relatively free from glomeruli, are ineffective in the production of such serum. It seems clear, therefore, that in the production of nephrotoxic anti-serums the antigenicity of whole renal cortex lies within the glomerulus.

FISHER, S., & KEOGH, E. V. (1950.) **Lysis by complement of erythrocytes which have adsorbed a bacterial component and its antibody.** [Correspondence.] —*Nature, Lond.* **165.** 248. **2306**

Polysaccharide components of many pathogenic bacteria may become adsorbed on to erythrocytes; the erythrocytes may then be agglutinated by an antibody against the polysaccharide. Haemolysis may take place under these circumstances if complement is present.

If the presence of antibody against *Mycobacterium tuberculosis* is sought by the agglutination test certain anomalous results may be encountered. Using the haemolytic test the results appear to be more reliable.

The estimation of antibody which neutralizes whooping cough virus haemagglutination is likewise more accurate by the haemolytic test than by agglutination.

—G. FULTON ROBERTS.

SCHNITZER, R. J., & KELLY, D. R. (1950.)

**Comparison of two different antagonists as inhibitors of acriflavine fastness of trypanosomes.—*J. Immunol.* 64. 95-99.** [Authors' summary copied verbatim.]

2307

Esters and amides of aromatic acids, a recently found group of antagonists of trypanocidal arsenoso compounds, share with p-rosaniline hydrochloride the property of also antagonizing the anti-trypanosomal effect of the acridine dye stuff acriflavine.

By the method of inhibition of drug resistance it was shown that by combination of acriflavine with the triphenyl methane dye stuff in serial passages the development of acriflavine resistance of *Trypanosoma equiperdum* was prevented. In similar experiments in which acriflavine and methyl-p-hydroxybenzoate were combined, an acriflavine fast modification of *T. equiperdum* was obtained which was identical with a strain treated with acriflavine alone.

Therefore, the mechanism of action of these two antagonists is probably different.

KABAT, E. A. (1949.) **Immunochemical studies on blood group substances.—*Bact. Rev.* 13. 189-202.**

2308

The chief antigens responsible for human red blood cell specificity are A and B; Group O cells, however, are not merely characterized by lack of the A and B antigens, but possess an O antigen. Chemical studies of these antigenic substances have resulted in some understanding of their constitution, but have shed little or no light on what chemical features are responsible for their specificity.

The blood group substances are to be found not only in the red cells, but also in the tissues and secretions of about 80% of human beings. Those whose blood group substances are confined to the red cells are termed "non-secretors" and those who secrete the group substances (appropriate to the substances in their red cells) are termed "secretors."

[This paper is concerned only with the AB0 groups—but it is of interest to note

that those who are "non-secretors" of one system of blood groups, e.g. AB0, may be "secretors" of another system, e.g. Rh.]

These human blood group substances, or ones very similar, are to be found widely distributed in the animal kingdom, e.g. hog gastric mucosa, horse saliva and stomach, etc.

Preparations of blood group substances may be made by extracting hog gastric mucosa after peptic digestion, with ethanol and purifying with phenol. The preparations so derived are predominantly carbohydrate, but contain some amino acids.

Assay of blood group substances can be determined by the degree of inhibition of agglutination of appropriate cells by a homologous antiserum. A method more suitable for immunochemical study is a precipitation technique in which relatively large volumes of serum are used, the reaction taking place over 7-8 days at 4° C. Maximum precipitation occurs in the zone of slight antigen excess.

Another means of studying the blood group substances is afforded by their cross-reaction with antisera against type XIV pneumococcus. Individual samples of group A substance which were identical in their reactions against anti-A, varied widely in their power to precipitate type XIV pneumococcal antisera. Experiments are described which indicate that side-chains of fucose may by projection stearically prevent the antiserum combining with the specific groups, probably N-acetylglucosamine-galactose. Hydrolysis reduces first the fucose side-chains without affecting the main carbohydrate groups, and is associated with increased reactivity.—G. FULTON ROBERTS.

KABAT, E. A., BAER, H., DAY, R. L., & KNAUB, V. (1950.) **Immunochemical studies on blood groups. XI. Species differences among blood group A substances.—*J. exp. Med.* 91. 433-447.** [Authors' summary copied verbatim.]

2309

The reactions of hog, human, and horse blood group A substances with antibodies produced on injection of these substances into individuals of blood groups B and O have been studied by hemagglutination inhibition and by quantitative precipitin techniques. Species differences in reactivity with antisera exist among these blood

group A substances. Hog and human A substances are very closely related chemically as evidenced by their extensive cross-reaction while horse A substance cross-reacts much less with antisera to both hog and human A substances. Analysis for hexosamine of specific precipitates of hog and human A substances and antibody to human A substance formed as a consequence of heterospecific pregnancy has shown that essentially all of the glucosamine of the blood group substance is precipitated.

CHARY, R. (1950.) Recherches sur les agglutinines et les hémolysines naturelles des sérums de cheval et d'âne. [Hæmagglutinins in the horse and donkey.] —*Rev. Path. comp.* 50. 199-203.  
[English summary.] 2310

Sera from five donkeys were tested by direct agglutination against red cell samples from 150 horses. In every case (except one) agglutination resulted. The titres of the anti-horse red cell agglutinins found in the

*See also absts.* 2173 (group B streptococci); 2189—2191 tuberculin test); 2192—2193 (BCG); 2204 (agglutination test in pullorum disease); 2231 (*T. equiperdum* infection in rats); 2240 (avian coccidiosis); 2250 (F. & M. disease vaccines); 2251 (of g. pigs with F. & M. disease vaccine); 2252 (type differentiation of F. & M. disease virus); 2256 (sheep pox vaccine); 2257 (equine influenza); 2270 (E.I.A.); 2273—2274 (caprine rinderpest virus); 2281 (mink distemper); 2283 (adsorbate distemper vaccine); 2467 (strain 19 in N. Zealand).

#### PARASITES IN RELATION TO DISEASE [ARTHROPODS]

HANNKEN, P. B. (1950.) Experiments with "Gammexane" in the control of lice on poultry and their bearing on the problem of vitamin D intake. [Correspondence.] —*Nature, Lond.* 165. 451. 2312

When birds were sprayed with gammexane (benzene hexachloride) no taste was noted in the meat or eggs. When the powder was heavily sprinkled on the floor, however, a certain amount of it was eaten; this not only tainted the meat and eggs but fertility and hatchability were also impaired. H. therefore considers that no gammexane is ingested during preening and that the birds are unlikely to obtain vitamin D through this route from preen oil as previously suggested in the literature, but the vitamin is probably absorbed through the skin or feather shafts.—E. EDEN.

DICKE, R. J., POPE, A. L., BRAY, R. W., & HANNING, F. (1949.) Investigation of rotenone and benzene hexachloride dusts for the control of insect ectoparasites on sheep.—*J. agric. Res.* 78. 565-569). 2313

donkey's sera ranged between 1 : 4 and 1 : 64. Of the sera from the 150 horses, however, when tested against donkey's cells, only 28 showed agglutination; the agglutination was weak and the titre in no case exceeded 1 : 8.

The sera containing agglutinins had weak haemolytic activity in the presence of complement.

C. suggests that those mares which have natural anti-donkey agglutinins are most likely to bear icteric mule foals if mated with a donkey stallion.

—G. FULTON ROBERTS.

TRAINA, V. (1950) Vitamin B<sub>12</sub> and histamine. [Correspondence.]—*Nature, Lond.* 165. 439-440. 2311

T. claims that "rubramin" as a source of vitamin B<sub>12</sub> when injected intraperitoneally prevented the death of g. pigs previously injected intracardiacally with 0.12 mg. of histamine. This action was not due to the inactivation of histamine or histaminase by "rubramin."—E. EDEN.

Groups of sheep were dusted with derris (1% rotenone) and benzene hexachloride (B.H.C.) (1% gamma-isomer) and were then run with an untreated control group. Weekly counts of adult keds (*Melophagus ovinus*) and pupæ and lice, *Trichodectes ovis*, showed that both substances gave complete control of lice throughout the period of the experiment (34 days) and that derris was slightly more effective against keds than was B.H.C. [The few keds counted on treated sheep could have been recently transferred from untreated sheep, or have recently hatched from pupæ]. Neither of the test substances imparted a detectable flavour to the flesh of treated sheep.

—G. B. S. HEATH.

WILSON, S. G., & NONGO, S. B. (1949.) The use of benzene hexachloride as a dispersable powder (Gematox 2) in cattle-dipping tanks. —*E. Afr. agric. J.* 15. 32-37. 2314

Large cattle dipping tanks were filled with the dip under test, and satisfactory con-

trol of ticks was obtained. After a few weeks, the dip (which was "topped up" but never drained) lost its efficiency. Repeat trials in the following year confirmed this result, which was not caused by a lessening of the benzene hexachloride (B.H.C.) content of the dip. The authors suggest that B.H.C. particles may become masked by dirt, or that the isomeric composition of B.H.C. changes in the bath.

—G. B. S. HEATH.

WHITNALL, A. B. M., THORBURN, J. A., WHITEHEAD, G. B., MC HARDY, W. M., & MEERHOLZ, F. (1949.) **A tick resistant to gamma-benzene hexachloride.** [Correspondence.]—*Nature, Lond.* **164.** 956-957. **2315**

The authors have confirmed by laboratory tests and field observations that the arsenic resistant strain of the blue tick (*Boophilus decoloratus*) from the East London district of S. Africa has developed a resistance to gamma-benzene hexachloride (B.H.C.); larval ticks are resistant to a standard dilution of 50 p.p.m. gamma-B.H.C., and only 35% adult female ticks are killed by a dilution containing 500 p.p.m. gamma-B.H.C.

—M. J. LETHBRIDGE.

ROBERTS, I. H. (1949.) **Benzene hexachloride dips for the destruction of psoroptic scabies mites on shorn sheep.** — *Vet. Med.* **44.** 471-475. **2316**

R. recommended the use of dips of benzene hexachloride containing not less than 0.06% gamma-isomer, although he found that a dip containing only 0.0075% killed all stages of the mites. He recognized the latent areas where mites remain alive on shorn sheep during the summer months, but the tests described were not controlled, and no attempt was made to maintain uniformity of age amongst the sheep used.

—M. J. LETHBRIDGE.

EADS, F. E., & HAWKINS, P. A. (1948.) **Tetraethylthiuram monosulfide for the treatment of mange and allied skin conditions in the dog.** — *N. Amer. Vet.* **29.** 355-358. **2317**

A clinical account of the treatment of

13 dogs with skin disease using thiuram monosulphide.

It is stated that of four with demodectic mange, two were cured in 4-5 weeks and that dogs with sarcoptic mange were cured in 1-6 weeks.—J. O. L. KING.

CHAMBERLIN, W. J. (1946.) **Entomological nomenclature and literature.** pp. 135. Ann Arbor, Michigan: Edward Brothers, Inc. **2318**

This is the second limited edition of this "lithoprinted" book intended for students. It was revised and enlarged and a short third section (14 pages) was added entitled "The Preparation of Articles for Scientific Publications." This section includes a brief history of early printing, a glossary of terms used in printing and notes on proof reading which include a list of proof reader's marks and a sample corrected proof sheet.

In the first main section on entomological nomenclature the author has given short biographies of Aristotle, John Ray, Francesco Redi and Carolus Linnaeus.

In the chapters that follow he describes clearly and systematically the history of zoological nomenclature setting out and discussing the international rules and the law of priority.

In the second section on Entomological Literature (72 pages) the author gives advice on how to review literature and assemble a bibliography, giving examples. He states that "To be able to know where to find information is as much a part of education as to acquire it."

The various sources are therefore pointed out systematically in the pages that follow "so that one seeking information upon any given phase of entomology, be it on a particular species, genus or order, or on insecticides, biological control or quarantine, will have at least an idea of how to find such information."

The print, which has the appearance of typescript, is good and pleasant to read, but unfortunately there are numerous mis-spellings and other typographical errors which are particularly noticeable in the pages dealing with foreign serial publications (pp. 87-94), but these will doubtless be corrected in a future edition.—F.E.W.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

WILLMOTT, S. (1950.) A new species of *Paramphistomum* from Scottish cattle.—*Trans. R. Soc. trop. Med. Hyg.* **43**. 354. [Only abst. given; abst. copied verbatim.] **2319**

It has been assumed that the only member of the family Paramphistomidae which occurs in this country [Gt. Britain—Ed. V.B.] is *Paramphistomum cervi*. On examining a number of specimens collected from the rumens of Scottish cattle killed on the Isle of Mull and in the Municipal Abattoir, Glasgow, it became apparent that two species occur. One is believed to be *P. cervi* and the other to be a new species.

DIMOCK, W. W. (1949.) The two-gram daily dose of phenothiazine for strongylosis of the horse.—*Vet. Med.* **44**. 99-102. **2320**

The technique described was worked out with the object of having an effective and non-toxic method for controlling equine strongylosis in race horses in Kentucky.

Phenothiazine was mixed with steamed bone meal and powdered minerals in such proportion that one heaped teaspoonful contained 2 g. phenothiazine. Teaspoonful doses were given daily to the horses, mixed into a grain feed of crushed maize and oats. The dose was given on each of the first 21 days in the month and withheld during the remainder of the month and this cycle of treatment was continued month after month for as long as three years. This method of treatment was entirely non-toxic and effective in controlling strongyles as determined by faecal egg counts. The only follow-up results obtained were in two colts which, after treatment for one month each, were killed on account of crippling diseases. Both colts were free from strongyles within a month of beginning of treatment, which however had no effect on ascarids.—J.E.

YUTUC, L. M. (1949.) Prenatal infection of dogs with ascarids, *Toxocara canis* and hookworms, *Ancylostoma caninum*.—*J. Parasit.* **35**. 358-360. **2321**

In spite of anthelmintic treatment prior to mating and adequate precautions against infestation of the unweaned puppies, serious infestation with *T. canis* and *A. caninum* occurred in two litters. It is suggested that the dams had been infested in the pre-gesta-

tion period and that a number of larvæ had been immobilised in the tissues, migration having been resumed during pregnancy.

—JAS. G. O'SULLIVAN.

GORDON, H. McL. (1949.) Phenothiazine and oesophagostomiasis. [Correspondence.]—*Vet. Rec.* **61**. 509-500. **2322**

G. gives epidemiological reasons to account for the varied effect of phenothiazine in sheep as reported from different parts of the world. In the first place the action of the drug, though definitely effective, seems to vary for no known reason unless it should be accepted that a high dose (over 30 g.) is always required. Secondly, there are two factors which influence control of nodular worm disease,—the long life cycle and the sojourn of immature worms in the intestinal wall nodules in which they are safe from anthelmintics, and the survival power of the parasite egg and larva on open ground. Whilst in Canada these stages are killed by frost, in warmer countries they usually survive until ingested by sheep at pasture. Examples of how all these factors influence control are quoted.—J.E.

WOLFANGER, L. (1948.) Magenwürmer bei Ziegen und Phenothiazin. [Phenothiazine treatment of stomach worms in goats.] — *Dtsch. tierärztl. Wschr.* **55**. 169-170. **2323**

A short account of the successful treatment of *Hæmonchus* and *Nematodirus* infestation in goats with phenothiazine, given in two doses each of 25 g., in the evening and the next morning before feeding. This large dosage was well tolerated, even by animals with advanced parasitic debility.

—J.E.

RIEDEL, B. B., BARBER, C. W., & HAYS, T. A. S. (1949.) The anthelmintic activity of quaternary ammonium compounds in chickens infected with *Ascaridia galli*.—*Poult. Sci.* **28**. 830-833. [Authors' summary copied verbatim.] **2324**

A quaternary ammonium mixture consisting of five per cent. alkyl-dimethylbenzyl-ammonium chloride and five per cent. alkyl-dimethyl-dichlor-benzyl-ammonium chloride was administered to chickens infected with *Ascaridia galli*. The groups of chickens fed ration supplemented with one part mixture

in 2,000 parts of ration weighed more and harbored larger numbers of worms than the groups of chickens fed the same ration without the supplement.

The mixture administered to chickens by individual treatment was found to be toxic and of no value as an anthelmintic.

ORLOV, A. I. (1947.) [Microfilariasis of the blood in horses.]—*Veterinariya, Moscow.* 24. No. 3. pp. 13-16. 2325

In Northern Russia filarial infection is

*See also absts. 2217 (liver fluke and "black disease"); 2372 (strongyles, ascarids and anoplocephala in equine enterocolitis); 2469 (report, Sierra Leone); 2476 (book, sheep diseases).*

#### SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCÆMIAS [INCLUDING FOWL PARALYSIS]

PASSEY, R. D., DMOCHOWSKI, L., ASTBURY, W. T., REED, R., JOHNSON, P. (1950.) Electron microscope studies of normal and malignant tissues of high- and low-breast-cancer strains of mice. [Correspondence.] — *Nature, Lond.* 165. 107. 2326

On ultra-centrifugation of tumour extracts from tissues and milk of high-breast-cancer strains of mice the sediment was carcinogenic, but supernatant fluids not containing any particles proved to be inactive. Electron microscope studies revealed these particles to be roughly spherical in shape and 200-300 Å in size. The sharp definition of the particles is considered to indicate that the variation in size is mainly caused by aggregation of smaller units.

—E. EDEN.

MOSCHCOWITZ, E. (1950.) Relation of lymphocytic infiltration of inflammatory origin to angiogenesis.—*Arch. Path.* 49. 247-266. [Author's summary copied verbatim.] 2327

#### NUTRITIONAL AND METABOLIC DISORDERS

KLINE, E. A., ENSMINGER, M. E., CUNHA, T. J., HEINEMANN, W. W., & HAM, W. E. (1949.) Effect of adding drugs to the ration of fattening cattle.—*J. Anim. Sci.* 8. 411-424. 2328

Hereford heifers two years old were used, 24 in 1946 and 40 in 1947. The animals were grain fed in four groups, three of which were respectively given supplements of arsenic trioxide, nux vomica, or

widespread and affects horses clinically chiefly at the height of summer. The syndrome may resemble that of a toxic helminth invasion or that of equine infectious anaemia. For mass diagnosis 10 ml. of suspected blood are mixed with 0.3 ml. of 20% solution of sodium citrate. Any microfilariae present become concentrated between the leucocytes and the erythrocytes after standing for two hours. A smear is then made and examined microscopically.—F.A.A.

Evidence has been submitted that in a wide variety of chronic granulomas autochthonous formation of new blood vessels is the rule and that it occurs in the course of a fibroblastic differentiation of the newly formed mesenchyme. This mesenchyme is formed primarily from lymphocytes that exude from blood vessels and to a lesser extent from fixed connective tissue cells which undergo a transformation. The mechanism of the angiogenesis represents a reversion to that which occurs in the embryo. The hyperplasia of the sinuses and the extramedullary blood formation in "congestive" splenomegaly are explainable in this interpretation. One of the functions of the lymphoid cell in chronic inflammation is its potentiality for being transformed to endothelium, and hence for angiogenesis. The newly formed vessels either persist or become destroyed. In the latter case the component cells revert to collagen and eventually to sclerotic connective tissue. The whole is viewed as part of the reparative process inherent in the concept of inflammation.

thiouracil for 120 or 201 days. A withdrawal period was allowed before slaughter. All three drugs increased food utilization and rate of weight gain. The effect was most noticeable during the first three months and with thiouracil at a level of 0.2% of the ration.—P. H. HERBERT.

MOREHOUSE, N. F. (1949.) Accelerated growth in chickens and turkeys produced

by 3-nitro-4-hydroxyphenylarsonic acid.—  
*Poult. Sci.* 28. 375-384. 2329

A group of 50 New Hampshire chicks was given drinking water containing 2.4 grammes per gal. of a preparation containing 2.69% of disodium 3-nitro-4-hydroxyphenylarsonate, together with sodium and ammonium phenolsulphonates, lactose and boric acid. At six weeks, the mean weight gain of the 45 survivors was 374 g., while that of the 45 surviving controls was 299.4 g.

The effective concentration in drinking water ranged from 0.000066-0.005125%, the optimum being 0.0025%. In the feed the effective concentration range was 0.000661-0.009259% and the optimum 0.009%. Treatment was most effective during the early part of the growing period.

Six treated groups of pullets began laying from 2-24.5 days earlier than controls (average 15.1 days). Egg weight was not less than that of the controls.

—NESTA DEAN.

MOON, F. E., & PAL, A. K. (1949.) The composition and nutritive value of bracken.—*J. agric. Sci.* 39. 296-301. 2330

Determinations of the composition and nutritive value of bracken stem and leaf at various stages of growth are recorded. The early leaf material is relatively high in protein (about 16%), this falls later in the season, whereas crude fibre increases with maturity. This is also the case for the tannin concentration. No correlation was, however, observed between "bracken poisoning" and tannin concentration or any other component of the bracken which was analysed in this study.—E. EDEN.

EWING, J. A. (1949.) Buttonclover. (*Medicago orbicularis*.) [Bloat].—*Circ. Tenn. agric. Exp. Sta.* No. 104. pp. 1-4. 2331

Cultivation for grazing and harvesting of button clover is described. In ten years' grazing of sheep only two cases of bloat were observed, in contrast to the frequency with which this condition occurs after feeding other legumes.

—P. H. HERBERT.

WISE, G. H., MILLER, P. G., & ANDERSON, G. W. (1947.) Changes in milk products

"sham fed" to calves. I. Effects of volume of milk fed.—*J. Dairy Sci.* 30. 499-506. 2332

Four calves with rumen fistulas were given, from nipples or open pails, five successive feeds each of 5 lb. of milk containing 4.2% fat. The extent to which this sham feeding modified the composition of the milk before its entry into the stomach was studied, the properties determined being the degree of lipolysis, the pH, the rate of rennet coagulation, and the fat percentage. Marked lipolysis occurred in the milk after feeding, as indicated by increased acidity and acceleration of coagulation by rennet. When given by nipple, the first portion fed underwent the greatest change; when given from an open pail, the difference in composition between successive feeds was less marked, though rennet coagulation was most rapid in the second increment. Lipolysis closely paralleled the degree of dilution of the successive feeds. It is suggested that as the volume ingested increases, the system of feeding and/or the time factor affects the secretion of saliva and consequently the dilution of the milk.—E. M. CRICKSHANK.

KNUTTI, R. E., GÖTSCH, J. B., & WARRICK, R. A. (1950.) Reciprocal changes in plasma protein and plasma acacia as result of high and low protein diets.—*J. exp. Med.* 91. 425-431. [Authors' summary and conclusions copied verbatim.] 2333

Dogs were made hypoproteinemic by repeated injections of gum acacia, and the acacia injections were discontinued. Diets of varying protein content were then given. When a high protein diet is provided the plasma protein concentration increases; with a low protein diet, or under conditions of fasting, the plasma protein concentration diminishes. Similarly, plasma acacia concentration shows increases and decreases which are reciprocal to the protein variations. Total circulating plasma protein and total circulating plasma acacia show similar changes. In all instances total circulating colloid (acacia plus protein) concentration adds up to an amount within normal limits for protein alone. The results indicate that under these conditions, acacia stored in the body (principally in the liver) can be removed from its site of deposit and returned to the blood. The data also show that dogs

in which acacia is deposited in large quantities, require a larger amount of protein in the diet to maintain a constant plasma protein content than do normal dogs. It appears that the mechanism for maintenance of peripheral colloidal material may be dependent on differences in intracellular and extracellular colloidal osmotic pressure. The experiments also support the idea that plasma protein molecules, as well as gum acacia, may pass in and out of cells through the cell membranes.

**REID, R. L. (1950.) Utilization of acetic and propionic acids in sheep. [Correspondence.]—Nature, Lond. 165. 448-449.**

2334

When seven sheep were kept on five different diets, 86-95% (molar basis) of the volatile fatty acids of the arterial blood was acetic acid. The levels observed were higher than in venous blood; the acetic acid was taken up by the tissues and presumably oxidized. Levels of propionic acid in the general circulation were low, indicating that this acid is removed rapidly from the portal system by the liver. Evidence is also presented that it is converted into glucose there.

—E. EDEN.

**v. WENDT, G., & MUELLER - LENHARTZ. (1949.) Die Baustoffe für die Milchdrüse. [The metabolism of the mammary gland.] — Tierärztl. Umsch. 4. 272-274.**

2335

A discourse on the importance of minerals in the diet of the cow.—A.T.C.

**HARVEY, D. G. (1950.) Some aspects of the mineral requirements of small animals.—Vet. Rec. 62. 143-152.**

2336

H. discussed the mineral requirements and symptoms of diseases caused by severe deviations from normal intakes as observed in dogs and cats (carnivores); rabbits and g. pigs (herbivores); and in rats and mice (omnivores). Total amounts of minerals found in the various tissues and milk of the different species are tabulated. Mineral composition of the most important food stuffs is also given. Many of the mineral deficiencies have been produced only in the laboratory; H. considers that rickets, dental hypoplasia, endemic goitre and nutritional anaemia are the most important conditions resulting from naturally occurring mineral

deficiencies and these are discussed in greater detail.—E. EDEN.

**OSBORNE, A. D., PATTERSON, J. B. E., & TREANOR, G. A. (1950.) Cobalt deficiency in Herefordshire and Worcestershire.—Vet. Rec. 62. 72-73.**

2337

Lambs on pasture in Herefordshire had clinical signs similar to "pining", a disease caused by cobalt deficiency. All the affected farms were on the Old Red Sandstone formation, known to give rise to soils deficient in cobalt in other parts of the country. The cobalt content of the soils examined on these farms was low; 0.14 Co. p.p.m. Twenty lambs were selected for experimental purpose. Half of these were dosed fortnightly with 14 mg. of cobalt in the form of cobalt sulphate. After 23 weeks the controls had only gained 7 lb. per head, whereas the gain in the treated lambs was 21.7 lb. Untreated lambs were also more susceptible to worm infestation when compared with those given cobalt.—E. EDEN.

**MOORE, C. W. E. (1950.) Pot culture studies of the copper and molybdenum content of certain pasture plants.—Aust. J. agric. Resc. 1. 43-51. [Author's summary copied verbatim.]**

2338

*Erodium cygnorum*, *Medicago denticulata*, and *Hordeum leporinum* were grown in pots on soils from toxæmic jaundice enzootic areas and from reputedly non-affected areas. The copper and molybdenum content of each species at flowering was determined.

The mean copper content of the plants grown on soils from the enzootic areas did not differ from that of the plants grown on soils from reputedly non-affected areas.

The copper-molybdenum ratio of the plants varied widely. The values obtained for plants grown on soils from the enzootic areas were no higher than those obtained for plants grown on other soils.

There was a significant difference between the copper contents of the three species. Although the copper content was not abnormally high in any of the species examined, the differences are great enough to indicate that variations in the botanical composition of the pasture may considerably influence the amount of copper ingested by the grazing animal.

JAMIESON, S., & ALLCROFT, R. (1949.) **Copper deficiency in cattle. With special reference to copper pine in calves in Caithness.**—*Scot. Agric.* **29.** 86-92. **2339**

Previous studies on copper deficiency in animals are summarized. The authors found that 20-25% of the yearling calves in Caithness (Aberdeenshire) had "copper pine." Stilted gait and progressive signs of malnutrition were noted. In black coloured calves the coat often lost its colour especially round the eyes, producing a "spectacled" appearance. The blood copper values of the calves and cows were low, whereas the copper values of the pastures fell within the normal range.

In the experimental investigation three calves were injected intravenously with 50 mg. of copper as copper sulphate; three others were given an oral dose of 500 mg. This treatment prevented the occurrence of clinical signs, but did not raise the blood and liver copper levels. Other calves were given 1,250 mg. of copper orally three times at monthly intervals; this not only prevented the pining but raised the blood and liver copper values.—E. EDEN.

LOWENHAUPT, E., SCHULMAN, M. P., & GREENBERG, D. M. (1950.) **Basic histologic lesions of magnesium deficiency in the rat.**—*Arch. Path.* **49.** 427-433. [Authors' summary copied verbatim.] **2340**

An inflammatory lesion of extremely general distribution, involving loose mesenchymal tissues in perivascular locations, in the magnesium-deficient rat is described. This lesion occurs within two weeks in the young rat. In the early, acute stage it is evidenced by a collection of inflammatory cells; it progresses to necrosis and to scar formation if the animal survives. In addition, obstructive casts are found late in the deficiency in the distal portions of convoluted and collecting renal tubules, formed by calcium salts precipitated in this location.

HIBBS, J. W., & POUNDEN, W. D. (1948.) **The influence of the ration and early rumen development on the changes in the plasma carotenoids, vitamin A and ascorbic acid of young dairy calves.**—*J. Dairy Sc.* **31.** 1055-1061. **2341**

After a colostrum feeding period, calves were assigned to one of six groups,

which were fed whole milk at a rate of 0.9 lb. per 10 lb. body weight for the experimental period of six weeks, and were given in addition the following dry feeds, with or without rumen inoculations (direct transfer of small pieces of cud material from cows to the mouths of calves); group (1)—alfalfa hay plus rumen inoculations; group (2)—alfalfa hay alone; group (3)—alfalfa hay plus grain (14% protein herd ration) plus rumen inoculations; group (4)—alfalfa hay plus grain; group (5)—alfalfa hay plus standard calf starter pellets; group (6)—whole milk only. Plasma carotenoid, vitamin A and ascorbic acid levels were determined on the fourth and seventh days of age, and thereafter weekly to the 42nd day.

**Plasma carotenoids:** no beneficial effect of rumen inoculations was observed. The groups fed alfalfa hay as the only dry feed had a steady increase, while when grain was included in the ration, there was a smaller increase. **Plasma vitamin A:** the level of this decreased in all groups except (5), which received a calf starter containing 5,000 U.S.P. units of supplemental vitamin A per lb. Rumen inoculations had no marked beneficial effects. **Plasma ascorbic acid:** this declined between the 7th-14th day in all except group (1). The greatest decline was in group (2).

When grain was introduced into the ration of four calves 64 days old from groups (1) and (2), a marked reduction in hay consumption and a lowering of blood carotenoids resulted; plasma ascorbic acid declined and plasma vitamin A increased during the same period.—E. COTCHIN.

EATON, H. D., JOHNSON, R. E., SPIELMAN, A. A., MATTERTON, L. D., & NEZVESKY, L. (1949.) **Prepartum milking. III. The plasma levels of carotene and vitamin A in calves from dams milked prepartum and in calves from dams milked postpartum.**—*J. Dairy Sci.* **32.** 1032-1037. **2342**

Ten days pre-partum milking before the onset of labour significantly lowered the plasma carotene and vitamin A levels of the calves 1-4 weeks of age, as compared to those values for calves from dams milked post partum only. Smaller weight increases and a higher incidence of scours were also observed, but these differences when analysed were not found to be statistically

significant.

The feeding of one million U.S.P. units of vitamin A per day to the dams for 30 days prior to parturition increased the plasma vitamin A level of the calves, but did not statistically alter the other three criteria. In all, 41 experimental calves were used.—E. EDEN.

PARRISH, D. B., WISE, G. H., LATTSCHAR, C. E., & HUGHES, J. S. (1950.) Effect of the prepartal diet of the cow on the placental and mammary transfer of tocopherols to the calf.—*J. Nutrit.* 40. 193-202. [Authors' summary copied verbatim.]

2343

A study was made of serum tocopherol levels in calves, at birth and during the first month of life. The calves were from cows fed either typical unsupplemented barn rations or similar rations supplemented during the terminal stages of gestation with vitamin A or tocopherols, or both. The levels of supplemental tocopherol fed the dams were 0.5—1, 4, 5 and 10 gm. daily. The first food the calves received was colostrum from their respective dams, followed later by a whole milk and grain-roughage diet.

Supplements fed the dams prepartally did not markedly affect the serum tocopherol levels in their newborn calves. Tocopherols per 100 ml. of serum were  $44 \pm 31$  micro g. in calves from unsupplemented cows and only  $79 \pm 29$  micro g. in those from cows supplemented at the highest level. Calves born with low serum tocopherol levels seemed to be as vigorous and healthy at birth as did those having the highest levels. The serum tocopherol levels of newborn calves increased three- to 9-fold following the ingestion of colostrum. The highest levels were found in calves whose dams received large amounts of supplemental tocopherols, but considerable individual variation in response was noted. By the 28th day after birth, tocopherol concentrations in calves were lower than during the period of colostrum feeding, and values for calves from supplemented cows were within the same range as those for calves from the unsupplemented. Decreases in serum tocopherol levels were observed in calves that were diarrhetic.

PINDBORG, J. J. (1949.) Role of the intesti-

nal flora in the development of vitamin E deficiency. [Correspondence.]—*Nature, Lond.* 164. 493.

2344

White rats, 4-5 weeks old, were given a basal synthetic diet deficient in vitamin E, and containing 1% of succinylsulphathiazole or phthalylsulphathiazole. After 40-50 days, depigmentation of the upper incisors was observed, and the enamel organ revealed histopathological changes, consisting of premature atrophy of the *stratum papillare* and the formation of cyst-like cavities in the ameloblasts. If 3 mg. of tocopherol were administered daily or if faeces from rats on a stock ration were incorporated in the deficient diet at a level of 20% these abnormalities did not occur. It is assumed that in certain circumstances vitamin E is synthesized in the rat's digestive tract.—E.M.C.

HARRIS, P. L. (1950.) Relation of vitamin E to intestinal flora and the intestinal absorption of tocopherol. [Correspondence.]—*Nature, Lond.* 165. 572.

2345

Vitamin E may be synthesized by the intestinal flora. H. considers that the presence of vitamin E in the faeces is not caused by synthesis, but by non-absorption of the dietary source. He describes experiments on rats and on human beings in support of this.—E. EDEN.

THOMAS, B., & WALKER, H. F. (1950.) The vitamin B content of grass.—*Agriculture, Lond.* 56. 558-561.

2346

Different types of grasses, legumes and herbs were analysed for aneurin, riboflavin, nicotinic acid, pantothenic acid, pyridoxin and biotin. The effects of manure and curing on the vitamin levels were also examined. The vitamin content was variable (no figures are quoted) and it is considered that in some cases it was insufficient without supplementary source to meet the requirements of animals.—E. EDEN.

YUDKIN, W. H. (1949.) Thiaminase, the Chastek-paralysis factor.—*Physiol. Rev.* 29. 389-402.

2347

This review describes the signs of Chastek paralysis in foxes induced by feeding raw fish. The cause of the disease is the presence of an enzyme thiaminase in the raw fish which splits the thiamine in the diet and produces a secondary vitamin B, defi-

ciency. The distribution, purification and properties of this enzyme are also given.

—E. EDEN.

JOHNSON, B. C., PINKOS, J. A., & BURKE, K. A. (1950.) Pyridoxine deficiency in the calf.—*J. Nutrit.* **40**. 309-322. [Authors' summary copied verbatim.] **2348**

The bovine species requires vitamin B<sub>6</sub>, supplied either in the diet or by rumen or intestinal symbiosis. On a pyridoxine-deficient diet calves do not grow, and the excretion of pyridoxine and its metabolites is lowered. Pyridoxine deficiency in the young calf reared on a pyridoxine-low "synthetic milk" ration is characterized by lack of appetite, anorexia, poor growth, sluggishness and listlessness, poor haircoat (dull and falling out), and in some cases by the appearance of severe epileptiform fits and death. If administered early enough, the calves respond to vitamin B<sub>6</sub> given as pyridoxal, pyridoxamine or pyridoxine.

RICHARDS, M. B. (1949.) Imbalance of vitamin B factors. The effect of conditioned pyridoxin deficiency on the development of young rats.—*Brit. J. Nutrit.* **3**. 109-132. **2349**

Young rats of both sexes were given from weaning a diet high in vitamin B<sub>1</sub> and calcium and low in the other vitamins of the B complex. The growth rate was retarded, the animals had fits and marked atrophy of the thymus was also noted. Administration of pyridoxin prevented the development of these symptoms. Other vitamins of the B complex tried were not so effective. Improvement was also noted if the high vitamin B<sub>1</sub> intake was reduced.

—E. EDEN.

RICHARDS, M. B. (1949.) Influence of the extraction rate of flour on conditioned pyridoxin deficiency in rats.—*Brit. J. Nutrit.* **3**. 132-152. **2350**

Rats were fed for four generations on diets containing 61% of wheat flour of 85, 80, 77 and 72% extraction to which was added an excess of vitamin B<sub>1</sub>. As the extraction rate of the flour decreased, signs of pyridoxin deficiency became more marked. These were: a decreased breeding performance, fits and decreased growth rate of the litters. These results emphasize

the unreliability of assessing the nutritive value of a diet by growth tests alone; breeding tests for several generations should also be carried out.—E. EDEN.

RICHARDS, M. B. (1949.) Further observations on conditioned pyridoxin deficiency in rats during lactation.—*Brit. J. Nutrit.* **3**. 153-161. **2351**

Of three diets (1) contained 72% extraction flour and was supplemented with large amounts of vitamin B<sub>1</sub>, this caused a conditioned pyridoxin deficiency; (2) contained flour of 85% extraction; (3) contained flour of 72% extraction, but was supplemented with pyridoxin. Diets (2) and (3) proved to be quite satisfactory for growth and reproduction, but the litters born of does fed exclusively on diet (1) were subject to fits and had atrophied thymus glands. In order to determine at which stage the pyridoxin deficiency was critical, (a) does were transferred from one diet to another, (b) some litters were suckled by foster mothers on a different diet and (c) some litters were given pyridoxin directly during lactation. From the results obtained, it was concluded that the prime factor was deficiency of pyridoxin in the milk which was dependent on the diet of the does during lactation.—E. EDEN.

SINGER, L., & DAVIS, G. K. (1950.) Pantothenic acid in copper deficiency in rats.—*Science*. **111**. 472-474. **2352**

Piebald and black rats were fed a diet containing 12.5 micron pantothenic acid per g. of feed. They were subdivided into two groups; the diet of group one contained only 1 p.p.m. copper, whereas that of group two was supplemented with copper sulphate so as to produce a final level of 20 p.p.m. On the low copper diet the animals had signs of greying hair after seven weeks; this, however, could be improved with daily doses of 30-40 micro g. calcium pantothenate.—E.E.

ANON. (1949.) Xanthopterin in animal nutrition.—*Nutr. Rev.* **7**. 131-133. **2353**

Xanthopterin has a similar molecular structure to that of folic acid. The effect of these two compounds and of blood serum on the growth of bone marrow cultures were compared. Striking increases in the red and white cells and also in the reticulocyte counts were observed in those cultures sup-

plemented with either xanthopterin or with normal blood serum; folic acid was not effective. This latter compound also produced a slower response than xanthopterin when injected into rats made anaemic with sulphathiazole. Xanthopterin may be the active form of folic acid, but further work is required to settle this point.—E. EDEN.

BRAUDE, R. (1949.) **Growth factor for pigs in liver extracts and its relation to piglet anaemia.**—*Brit. J. Nutrit.* 3. pp. xiv of Absts. copied verbatim. 2354

Results of three experiments showed that there is a factor in liver extracts which exerts a positive effect on the rate of growth of piglets reared indoors when they receive the extracts as a supplement together with iron. The factor has no effect on haemoglobin concentration in blood, and thus, by itself does not prevent the development of anaemia in piglets reared indoors. The factor is not present in a yeast extract. It is not active in pigs reared out of doors. Litters born in winter respond much better to liver extract supplement than litters born in summer. The results justify speculation that the growth factor involved is the recent isolated vitamin  $B_{12}$  or an entity closely associated with it. Experiments to substantiate this hypothesis are in progress.

LILLIE, R. J., MARDEN, S. J., GROSCHKE, A. C., & BIRD, H. R. (1949.) **Relative requirement and source of vitamin  $B_{12}$  for turkeys and chickens during the later stages of growth.**—*Poult. Sci.* 28. 541-548. 2355

Using growth tests of turkey poult and baby chicks as criteria, it was found that meat meal was a less potent source of vitamin  $B_{12}$  than fish meal. It was also observed that the requirements, when expressed per unit feed, were less during the later (after eight weeks) than during the early stages of growth.—E. EDEN.

LILLIE, R. J., OLSEN, M. W., & BIRD, H. R. (1949.) **Role of vitamin  $B_{12}$  in reproduction of poultry.**—*Proc. Soc. exp. Biol., N.Y.* 72. 598-602. 2356

Eggs from Rhode Island Red hens fed a diet deficient in vitamin  $B_{12}$  were injected with vitamin  $B_{12}$  (0.9-1.25 micron) or with water. The percentage of hatchability was higher in eggs injected with vitamin  $B_{12}$

than those not injected or injected with water. Among the chicks hatched from vitamin  $B_{12}$  injected eggs the growth rate was greater, the mortality lower and the feathering better than in the other two groups.—E. EDEN.

MUSHETT, C. W., & OTT, W. H. (1949.) **Influence of crystalline vitamin  $B_{12}$  on gizzard erosions in chicks.**—*Poult. Sci.* 28. 850-854. [Authors' summary copied verbatim.] 2357

Chicks fed a ration containing 70% soybean meal and all recognized nutrients including crystalline vitamin  $B_{12}$ , showed fewer and less severe gizzard erosions than chicks given the same diet without vitamin  $B_{12}$ .

Whereas a level of 2.5 micrograms vitamin  $B_{12}$  per kilogram of basal diet almost completely prevented the gizzard disorder in chicks from hens fed a commercial breeder ration, 10 micrograms vitamin  $B_{12}$  per kilogram of basal diet were required for a similar effect in chicks from hens fed an all-vegetable ration.

The hearts and livers of chicks fed the unsupplemented basal ration were relatively larger and the spleens were smaller than the corresponding organs in the vitamin  $B_{12}$  treated birds.

The hemoglobin levels in the chicks which received vitamin  $B_{12}$  were approximately the same as those in the chicks fed the basal ration without vitamin  $B_{12}$ .

WILKINSON, J. F. (1949.) **Megalocytic anaemias.**—*Lancet.* 256. 249-255; 291-296; & 336-340. 2358

W. discussed different types of megalocytic anaemias, the main emphasis being on pernicious anaemia. This disease has so far been observed only in human beings and its experimental production in animals has failed. The three factors, extrinsic, intrinsic and liver principle were discussed; it is considered that the combination of the first two gives rise to the third, hence patients can be treated by either supplying them with haemopoietin and beef protein or with the active liver principle. Haemopoietin can be isolated from the normal human stomach, or from pigs, and also from silver foxes or other carnivores; it is absent in herbivores. The liver principle is more widely distributed and is present in all healthy mammals,

in some fish, but not in several reptiles examined. The role of folic acid in anaemia was also discussed: although this compound is useful in many types, it is contra-indicated in pernicious anaemia. This latter disease can be treated so satisfactorily with the liver principle that affected persons should maintain health for at least the normal expectation of life.—E. EDEN.

DRAPER, H. H., & McELROY, L. W. (1949.)

**A study of nutritional anaemia in suckling pigs.** — *Sci. Agric.* **29.** 370-375. **2359**

Groups of unweaned pigs (not less than six animals) were given supplements of reduced iron (210 mg.) in glucose from 1, 3, 4-6 or 8 days after birth. Controls in most cases were litter mates. To this iron mixture was added, in other experiments, copper sulphate (35 mg.); folic acid (10 mg.); folic acid 25 mg.; pyridoxine (30 mg.); pyridoxine (30 mg.) + folic acid (10 mg.). All supplements were single doses given weekly. Determination of haemoglobin values indicated clearly that it was important to start supplementation within three days of birth to prevent the development of anaemia. The additional copper sulphate (started at one day of age) or vitamins (started at 4-6 days) were not effective in increasing haemoglobin values. The figures from pigs given the larger quantity of folic acid suggest that this may actually have depressed the rate of haemoglobin formation. One litter of eight having been given no previous supplements was put to pasture at 11 days. Spontaneous and rapid increase in haemoglobin occurred in every animal. No difference in haemoglobin values was found between male and female pigs.—P. H. HERBERT.

JOHNSON, B. C., & JAMES, M. F. (1948.)

**Choline deficiency in the baby pig.** — *J. Nutrit.* **36.** 339-349. **2360**

Nine pigs from two litters were placed on a "synthetic" ration at one or four days of age. Three were given the complete ration which has previously been found to raise pigs successfully to weaning. Three were given this ration with choline, inositol and *p*-amino-benzoic acid omitted, the remainder were given the ration with only choline omitted. One control pig died on the second day, but all the others survived the eight week experimental period. Pigs were fed *ad libitum* and were given sulphur-

thalidine (2% of diet). Growth rates, haemoglobin levels with red and white corpuscle counts are recorded together with the results of histological examinations of liver biopsies taken at end of the experiments. In both groups without choline there was marked retardation of growth. Haemoglobin and white cell counts revealed no differences between the groups, but red cell counts rose more slowly in both the restricted groups as compared with the controls. The livers in these two groups had marked fatty infiltration and those in the control group were normal. The livers of animals lacking inositol and *p*-amino-benzoic acid as well as choline may have been more heavily infiltrated than those lacking only choline.

—P. H. HERBERT.

GREEN, W. W., KERNKAMP, H. C. H., ROEPKE, M. H., & WINTERS, L. M. (1949.) **A toxemic-uremic syndrome in baby pigs fed on dried skimmilk.** — *Amer. J. vet. Res.* **10.** 256-264. **2361**

Piglets, aged 7-14 days and fed fat-free skim milk supplemented with minerals and vitamin A, developed a disease similar to the naturally occurring toxæmic and uræmic syndrome. The clinical signs were vomiting, diarrhoea, dehydration, itching, muscular jerks, stupor and coma, and chemical examination indicated high blood urea levels. On P.M. examination degenerative changes were noted in the liver, kidneys and adrenal glands. The addition of dextrin accentuated and that of cereal, grass and yeast seemed to alleviate this disorder.

—E. EDEN.

QUIN, A. H., AUSTIN, J. A., & RATCLIFFE, K. (1949.) **A new approach to the treatment of bloat in ruminants.** — *J. Amer. vet. med. Ass.* **114.** 313-314. **2362**

Since it is probable that bloat is primarily due to gas entrapment brought about by decreased surface tension, the logical treatment is to administer agents which increase surface tension. One such agent—highly polymerized methyl silicone—has been tested in 155 cases of bloat in cattle. Of these, 115 made a perfect recovery after a single treatment. The dose is 100 ml. for adult cattle and 25 ml. for sheep and goats. A recovery rate of approximately 80% was obtained when the drug was given by the mouth, but this was

increased to 95% when it was given by intraruminal injection.—J. A. NICHOLSON.

ALLCROFT, R., & PARKER, W. H. (1949.) **Hypocupraemia in dairy cows.**—*Brit. J. Nutrit.* **3.** 205-217. **2363**

Dairy cattle, pastured on peat land on the Cheshire-Shropshire border, were observed to have severe, persistent diarrhoea, lowered milk production and fertility and general unthriftiness. Blood copper levels were also low, but anaemia was absent. Pasture levels of copper and molybdenum were within the normal range. Young calves remained normal up to about nine months of age, but their condition steadily declined with grazing on the peat pasture.

Dosing with 2 g. copper sulphate per day for 14 months raised the blood copper levels and improved the clinical picture. Mineralized licks containing only one-third of this amount of copper were not so effective. Animals removed to a different pasture improved in condition without immediate rise of blood copper.—E. EDEN.

BLOOD, D. G., & WHITE, I. G. (1949.) **The effect of parturition on the physiology of dairy cows in relation to milk fever.**—*Aust. vet. J.* **25.** 114-122. **2364**

Blood chemistry studies are reported upon 16 high-producing Jersey cows, eight of which developed milk fever within 24 hours of parturition.

All cows had normal preparturient levels of total serum calcium. At parturition there was a significant decrease in normal cows, but a significantly greater decrease in milk fever cows. Levels of ionized serum calcium were determined by an indirect method based on human data. Both groups had normal preparturient levels. At parturition a significant decrease occurred only in the milk-fever cows.

Preparturient levels of total serum protein were constant in normal cows, but there was a significant decrease in the last preparturient week in milk-fever cows, and the levels in these cows at parturition were significantly lower than in the normal cows.

No significant variations in total serum magnesium occurred in either group.

—J. H. WHITTEM.

LESLIE, A. (1949.) **Milk fever of ewes in New Zealand.**—*Proc. 9th Ann. Conf.*

*N.Z. Soc. Anim. Prod.*, 1949. p. 153. **2365**

The paper dealt mainly with the predisposing and causative factors of milk fever of ewes and to a lesser extent of cows. Incidence in ewes is often 5%, while 33% in a flock of 150 lambing ewes has been recorded. In Central Taranaki district the average incidence in bad years is 4% in cows of the susceptible age (30,000 cows).

Outbreaks in ewes may occur several weeks after lambing, during periods of fasting, and road and rail journeys. Excessive steaming up prior to lambing as a preventive of ketosis (pregnancy disease) may result in a high milk fever incidence, and also eversion of the vagina in ewes.

Milk fever in both ewes and cows is regarded as a disease of management, and is preventable (1) by keeping the animals physically fit by good steady feeding, (2) by avoiding sudden changes in the plane of nutrition, (3) by avoiding excess of green crops and pastures known to be prone to precipitate milk fever, (4) by feeding lactating ewes so as to prevent excessive weight-loss as a result of milk production, (5) by avoiding undue fasting or travelling of pregnant or lactating ewes.

Protein-rich fodders and also known milk fever-producing fodders should be used sparingly, but ewes and cows should not be underfed before parturition. Pasture in the immature, growing stage, second growth of oats, wheat, barley, chou-moelier, rape and kale are regarded as likely precipitants of milk fever. The same fodders are also associated with the occurrence of rickets in hoggets in New Zealand, although their mode of action is not understood in either disease.

A restricted intake of such fodders, with ample good hay and other low-protein fodders for a few days before and after lambing and calving, and a gradual introduction to better feed are the main preventive measures suggested for milk fever in both ewes and cows.—J. B. SWAN.

O'MOORE, L. B. (1950.) **Cobalt therapy in pregnancy toxæmia in ewes.** [Correspondence.]—*Vet. Rec.* **62.** 178. **2366**

Ewes with pregnancy toxæmia were dosed daily for five or six days with one oz. of a 1 : 160 aqueous solution of cobalt

sulphate and several oz. of glucose or other sugar. If treatment was commenced soon after the first symptoms appeared, recovery followed within four days. This, however, was not the case if treatment was delayed.

—E. EDEN.

CURNOW, D. H. (1948.) **The oestrogenic factor in subterranean clover in Australia.** —*Rep. Proc. Conf. Grassl. & anim. Hlth. 1948.* pp. 71-73. The National Veterinary Medical Assoc. of Gt. Britain and Ireland. **2367**

Infertility of the ewe, death of the full-term foetus and prolapse of the uterus are the main clinical symptoms of sheep grazing on pasture where the herbage predominantly contains subterranean clover (*Trifolium subterraneum*). In wethers (castrated males) and virgin sheep there may be udder development and milk secretion. The cystic glandular hyperplasia of the endometrium observed, has also been reproduced in g. pigs when fed this plant. All these factors suggest the presence of an oestrogenic factor. The results so far obtained on the isolation of this factor are summarized. An attempt is also being made to develop subterranean clover strains low in this oestrogenic principle.—E. EDEN.

KURZ, G. (1949.) Beobachtungen bei der Kropfenzootie in meinem Saanenziegenbestande. [Goitre in a herd of goats.] —*Wien. tierärztl. Mschr.* 36. 16-17. **2368**

K. described the effect of treatment with "thyreosan," iodine and dietary changes upon three goats affected by nutritional goitre.—G. P. MARSHALL.

ANON. (1949.) Nutrition and arteriosclerosis. —*Nutr. Rev.* 7. 155-157. **2369**

A short review in which the author considers possible ways of controlling the high blood cholesterol levels, which may be

*See also abst. 2312 (vitamin D); 2378 (dental cavities in hamsters on sugar diet); 2403 (carotene and vitamins A in colostrum); 2473 (book, biochemistry of food); 2476 (book, sheep diseases).*

## DISEASES, GENERAL

HOGG, L., PAYNE, J. T., & PEARSE, H. E. (1950.) **Experimental flash burns. The pathologic aspects.** —*Arch. Path.* 49. 267-277. [Authors' summary copied verbatim.] **2371**

The importance of the flash burn was emphasized at Pearl Harbor and by the large

a feature in the development of the disease.

—P. H. HERBERT.

KING, L. S., & MEEHAN, M. C. (1948.) **Sporadic demyelinating diseases of animals. A study in comparative pathology.** —*Arch. Path.* 46. 567-598. **2370**

This is an extremely valuable review of demyelinating diseases of animals. It is an example of a really enlightened attitude towards comparative pathology. There are pertinent comments on demyelination "as a process" which should be pondered by all whenever such diseases are considered. In the authors' view (which might seem almost heretical) the availability of stains specific for myelin has overemphasised the condition of this tissue in human diseases; this has engendered a tendency to confuse demyelination as a "condition" with that as a "kind" of disease. Any disorder in which there has been myelin loss thus becomes a demyelinating disease. The term should be reserved for a process which primarily affects white matter as a structure. This is all discussed in a very liberal manner.

The authors then critically review existing knowledge on demyelinating diseases in the different species: —Schilder's-like disease of apes and monkeys (confluent leucoencephalosis and myelosis of Scherer and van Bogert); swayback in lambs; acute haemorrhagic (epizootic) leucoencephalitis of horses in the U.S.A. (commonly known as mouldy corn disease); and finally the evidence for and against the aetiological role of viruses in demyelinating encephalitis of dogs.

There follow at the end chapters on terminology relating to a discussion of disseminated encephalomyelitis and on the critique of demyelinating diseases. There is an excellent bibliography relating to the animal conditions.—J. R. M. INNES.

number of burned casualties at Hiroshima and Nagasaki. Experimental flash burns were produced on swine by exposing the animals to the heat of burning magnesium flash powder. The burns were characterized on histologic section by abrupt demarcations laterally and horizontally. The

lesions healed by sequestration or organization of the burned tissues. The cutaneous blood vessels beneath the burns retained reactivity, so that erythema and edema were prominent. The physical and the physiologic aspects of these lesions are under investigation.

ZAPADNYUK, I. P. (1946.) [Equine enterocolitis.]—*Veterinariya, Moscow.* 23. No. 12. pp. 22-26. **2372**

Z. indicates what he believes to be the sequence of developments in the alimentary tract that lead to the onset of illness. Wrong feeding, overwork and infestations with strongyles, ascarids or anoplocephala are mentioned as the main causes of the condition of horses here described as enterocolitis.—F.A.A.

WEBER, A. F., MORGAN, B. B., & McNUTT, S. H. (1949.) Perimetrial hemorrhage in virgin heifers.—*Cornell Vet.* 39. 261-265. **2373**

Fifteen of 17 heifers slaughtered during oestrus to the fourth day after oestrus had perimetrial haemorrhages. These haemorrhages ranged from a few scattered petechiae on the greater curvature of the uterine horns and dorsal aspect of the uterine body to massive petechiae and diffuse haemorrhage in these areas. Thirteen of the cases were classified as slight. Similar haemorrhages were not present in 16 heifers slaughtered at other stages of the cycle. Perimetrial haemorrhages were not found in 25 cows slaughtered within four days of oestrus.

—ALFRED T. COWIE.

BAUMANN, R., & LIEBISCH, H. (1949.) Die morphologischen Grundlagen der Wachstumstörung beim hypothyreotischen Zwergwuchs der Ferkel. [The morphological basis of growth disturbances in dwarfing of pigs resulting from thyroid deficiency.]—*Wien. tierärztl. Mschr.* 36. 281-285. **2374**

The authors describe changes, considered to be similar to those observed in hypothyroidism of human beings and experimental animals, in the bone marrow and in the surrounding bone structure of piglets in which growth was retarded.—E. EDEN.

BANFIELD, W. G., HACKEL, D. B., & GOODALE, W. T. (1950.) Cardiac lesions following venous catheterization of the right

auricle and coronary sinus of dogs.—*J. Lab. clin. Med.* 35. 287-293. [Authors' summary copied verbatim.] **2375**

The auricle and coronary sinus were catheterized in dogs asatraumatically as possible. Thrombi, and subendocardial hemorrhages, in some instances associated with small myocardial hemorrhages, were observed at autopsy forty-eight hours later. The lesions occurred at the sites where the catheter tip or shaft impinged on the endocardium. Even with the simplest procedure possible, represented by catheterization of the auricle alone, lesions, though small, were still found. The possible factors which might explain why these lesions are found in dogs but apparently not in man have been discussed.

KING, J. D. (1950.) Dental cavities in the golden hamster.—*Brit. med. J.* April 15th. 876-877. [Author's summary copied verbatim.] **2376**

The relative incidence and distribution of dental cavities in hamsters are described, following experimental feeding of diets containing high proportions of refined and raw sugar. In contrast to the findings of other workers, it was observed that the lesions arose in the cementum of the molar tooth roots, whence they progressed through the dentine to the pulp. Disintegration of the coronal dentine and enamel occurred as a secondary extension of the root cavities, and in no instance could primary cavitation of the enamel be established. The lesions were associated with irritation and other disturbances due to penetration by calculus-like material and impacted food debris, and similar phenomena have been encountered in ferrets. The differences between the hamster syndrome and enamel caries in man are discussed.

LINDSAY, S., & CHAIKOFF, I. L. (1950.) Coronary arteriosclerosis of birds. A comparison of spontaneous and experimental lesions. — *Arch. Path.* 49. 434-446. [Authors' summary copied verbatim.] **2377**

A comparison has been made between spontaneously occurring coronary arterial disease of birds [fowls] and the lesions induced in the coronary arteries of birds by lipemias of endogenous origin (diethylstilbestrol injection) and exogen-

ous origin (cholesterol feeding). A spontaneous coronary arterial lesion in the form of a small intimal fibrous plaque entirely free of lipids was found in 4 of 12 control birds. This spontaneous intimal lesion was not found in the diethylstilbestrol-treated birds. In these birds the coronary vascular lesions were confined entirely to the media and consisted of lipids only. Various coronary vascular lesions were observed in the cholesterol-fed birds. Initial medial depositions were found in a few instances, but in the majority the disease appeared to be intimal in origin. No evi-

dence was obtained to support the view that a medial degenerative lesion precedes the appearance of intimal disease in the normal control, the diethylstilbestrol-treated or the cholesterol-fed bird.

DJAENOEDIN, R., & SOEMANAGARA, R. M. T. (1949) Een geval van hypoplasia foliorum omasi. [A case of hypoplasia of the folds of the omasum.]—*Hemera Zoa*. 56. 237-239. **2378**

A note on a case of tympanites in which there was hypoplasia of the leaves of the omasum.

See also absts. 2371 (demyelinating diseases); 2476 (book, sheep diseases); 2477-2478 (book, poultry diseases).

## POISONS AND POISONING

MACKAY, E. M., JORDAN, M. D., & MACKAY, L. L. (1949.) Experimental pulmonary edema. II. Pathogenesis of pulmonary edema caused by ammonium ion.—*Proc. Soc. exp. Biol., N.Y.* 72. 421-424. **2379**

G. pigs developed pulmonary oedema when given 1,200 mg. per kg. body weight of a 12% solution of ammonium chloride. This could be prevented by adrenergic blocking agents or central nervous system depressants (e.g. continued ether anaesthesia), but not by antihistaminic agents. From this it is concluded that oedema results from the release of epinephrine from the adrenal glands, probably caused by nervous stimulation. Hyperglycaemia and other signs resulting from the administration of the ammonium salt seemed to be independent of the oedema. Animals in which the oedema was prevented, still succumbed as a result of the other effects of the ammonium ion.

—E. EDEN.

SCHULTE, F. (1950.) Thalliumvergiftung beim Hund. [Thallium poisoning in a dog.]—*Dtsch. tierärztl. Wschr.* 57. 92-93. **2380**

Intermittent diarrhoea and vomiting were noted in thallium poisoning of dogs. A detailed description is given of the changes in the skin considered to be most useful for identifying cases of thallium poisoning. Histological studies and the chemical estimation of the level of thallium in the body are also recorded.—E. EDEN.

LURIE, J. B. (1949.) Acute toluene poisoning.—*S. Afr. med. J.* 23. 233-236. **2381**

An African, cleaning out a D.D.T. emulsion tank, became unconscious owing to the toxic effects of toluene in the emulsion fluid. Nervous symptoms such as disorientation, excitability and irritability were the first to occur; later acute pulmonary symptoms were predominant. The patient was treated for shock and given coramine, ephedrine, and penicillin and recovered after a week.—R. MARSHALL.

OPIE, E. L. (1950.) The effect of injury by toxic agents upon osmotic pressure maintained by cells of liver and of kidney.—*J. exp. Med.* 91. 285-294. [Author's conclusions copied verbatim.] **2382**

As shown in a previous paper the cells of the liver and of the kidney maintain an osmotic pressure approximately twice that of blood and of erythrocytes, exceeding this slightly in the case of liver and being slightly less in that of kidney. When liver cells are injured by chloroform or by carbon tetrachloride the osmotic pressure they maintain falls to the level of the medium that surrounds them but is promptly restored when recovery from the injury, with some regeneration of liver cells, occurs. When nephrosis is caused by potassium chromate or by chloroform the osmotic pressure maintained by parenchymatous cells of the renal cortex falls to that of the medium about them but returns to its normal level with recovery from the injury.

STOCKEN, L. A., & THOMPSON, R. H. S. (1949.) Reactions of British anti-Lewisite with arsenic and other metals in living

**systems.**—*Physiol. Rev.* **29.** 168-194. **2383**

An extensive review is given of the biochemical lesion in arsenic poisoning, of the chemistry and pharmacology of B.A.L. (British anti-Lewisite 2, 3-dimercaptopropand) and other related dithiols. The treatment of experimental arsenic poisoning with B.A.L. and the possible detoxication of other metals (mercury, gold, lead, cadmium, antimony, etc.) are also discussed.—E.E.

**ROSENBERG, M. M., & TANAKA, T. (1950.)**  
**Toxicity of chlordan to growing chickens.**  
*—Amer. J. vet. Res.* **11.** 233-235. [Authors' summary copied verbatim.] **2384**

Chlordan, when fed at concentrations ranging from 0·10 to 0·25 per cent. of total ration, proved poisonous to 1-week-old chicks. At these levels, the earliest deaths were recorded within one+ days following the addition of chlordan to the ration. Chlordan, when fed at a concentration of 0·05 per cent. of the total ration, killed 66·6 per cent. of 1-week-old chicks within fourteen days.

Resistance to chlordan poisoning increased markedly in the several age groups. Using the 0·25 per cent. chlordan concentration as a basis of comparison, it was observed that the earliest deaths occurred as follows: one+ days for the 7-day, two+ days for the 21-day, four+ days for the 63-day, and eight+ days for the 112-day-old chicks. This level of chlordan was toxic to all age groups when fed for twenty-one days.

The primary lesions noted in this study were in the heart. There was an excessive quantity of fluid in the pericardial sac, enlargement and distortion of the heart, and engorgement of the coronary vessels. It is recommended that the use of chlordan be restricted to areas not accessible to young chicks.

**WESTERMARCK, H. (1948.)** Dosingens inverkan paa phentiazinets toxiska och antiparasitära effekt, särskilt med hänsyn till detta ämnes inverkan paa blodets bilirubin-, hemoglobin- och protrombinspegel. [**Toxicity of phenothiazine for horses.**]—*Suom. Eläinlääkäril.* **54.** 43-72. [In Swedish. English summary.] **2385**

In a comprehensive study 50 horses, including heavy, light and thoroughbred

types, were dosed with phenothiazine of three degrees of purity, the contaminant being diphenylamine, such as would be present in the crude bulk drug. Dosages given varied from 10-40 g.

Hæmatological tests showed that doses of more than 30 g. of impure drug could cause haemolysis about one week after treatment. The blood picture was hardly affected and the only change was leucocytosis. Bilirubinaemia and delay in blood clotting time were both caused by the impurity, but never by pure phenothiazine. The blood haemoglobin was reduced by phenothiazine in accordance with the dosage.

In general, doses of 30 g. could be regarded as toxic and were therefore contraindicated. The best amount to give as standard is said to be 20 g. either as a single dose or divided into as many as four daily doses. Thoroughbreds should be treated with purified phenothiazine.

Activity of the drug against ascarids was low, but could be improved by giving 20 ml. of alcohol by stomach tube. Anti-anæmia treatment is suggested in case of toxic reactions.—J.E.

**WISE, G. H., JAMES, C. A., & ANDERSON, G. W. (1947.)** Toxicity of phenothiazine derivatives excreted in the milk of dairy cows treated with massive doses of the drug.—*J. Dairy Sci.* **30.** 55-59. **2386**

Three lactating cows were each dosed with 125 g. of phenothiazine. There was a precipitous fall in the milk yield of two and a moderate fall in the third. Phenothiazine derivatives [not specified] were detected in the milk for 36-60 hours after dosing. The milk was fed to rats without causing harm and had good keeping properties. The authors concluded that the milk of phenothiazine-treated cows is probably harmless to human consumers.—J.E.

**STODDART, L. A., HOLMGREN, A. H., & COOK, C. W. (1949.)** Important poisonous plants of Utah.—*Spec. Rep. Utah agric. Exp. Sta.* No. 2. pp. 1-21. **2387**

22 plants accounting for 95% of plant poisoning in Utah are described in detail and illustrated with coloured plates. Details are also given of where they grow, how they are recognized, how the susceptible animals are affected and in which season the plants are most dangerous. In some cases the

active principle is known: e.g. hydrocyanic acid in arrow grass and chokecherry (*Prunus virginiana*), oxalic acid in greasewood (*Sarcobatus vermiculatus*) and halogeton (*Halogeton glomeratus*), and selenium in various species.

Many of these plants, however, are harmless when consumed in small amounts and the authors consider that the main cause of outbreaks of plant poisoning is under-feeding; at such times animals eat these plants in large amounts.—E. EDEN.

GUNNING, O. V. (1949.) **Poisoning in goats by black nightshade (*Solanum nigrum*).** —  
Brit. vet. J. **105.** 473-474. **2388**

Goats were observed with severe abdominal symptoms; on examination the pasture was found to contain considerable amounts of black nightshade (*Solanum nigrum*). It is suggested that the alkaloid solanine was responsible for the poisoning.  
—E. EDEN.

HUANG, T. C., CUNHA, T. J., & HAM, W. E. (1950.) **The deleterious effects of flat pea seed [*Lathyrus sylvestris*] for rats.** —  
Amer. J. vet. Res. **11.** 217-220. [Authors' summary copied *verbatim*.] **2389**

It can be concluded from the data obtained that vitamin supplementation with all ten known members of the B-complex vitamins, even at levels which were 60 times the normal requirement, had no appreciable effect upon tolerance of rats to the toxic principle found in flat pea seed. Although there was inconclusive evidence that, in the case of small weanling rats, the survival time was lengthened by the addition of high levels of the B vitamins; in all cases, the levels of the B vitamins; in all cases, the rats eventually exhibited the typical symptoms of the poison. Injections of large doses of thiamine, riboflavin, pyridoxine, or ascorbic acid had no effect in alleviating the toxicity syndrome. Methionine mixed in the ration, likewise gave no beneficial results. The toxic substance is evidently not an anti-vitamin, but we believe that it may be

*See also absts. 2371 (demyelinating diseases); 2469 (report, Sierra Leone).*

alkaloid in nature. The toxic principle can be extracted from the seed by ethyl alcohol (30%) and is stable to drastic heat treatment.

Data obtained indicate that there is a definite relationship between age and increased body weight and tolerance by rats to the toxic substance. Small weanling rats were unable to survive the feeding of 20 per cent. of the flat peas in the diet, while rats weighing 85 Gm. and 200 to 250 Gm. were able to tolerate 20 and 30 per cent. respectively. The actual limit of the flat pea level for adult rats appears to lie between 30 and 40 per cent. There is some evidence that adult rats, at least, may be able to build up a tolerance to the poison when it is given over a prolonged period, inasmuch as a few rats survived until a 45 per cent. level of the flat peas had been reached, after being gradually increased over a period of thirteen weeks.

ROSENFIELD, I., & BEATH, O. A. (1950.) **Toxic effects of crude ergot.** —  
J. Amer. vet. med. Ass. **116.** 308-311. [Authors' summary slightly modified.] **2390**

Mice fed for thirty days with feed containing 2 per cent. of ergot showed no toxic effects. If the concentration of ergot was increased to 5 per cent., the animals lost weight and several males developed gangrenous tails. Rapid loss in weight and death of the animals occurred when the concentration of ergot was increased to 10 and 15 per cent. Ergot feeding affected the internal heat-regulatory mechanism of the animals, since increase or decrease in the environmental temperature caused the death of the ergotized animals. Age and weight of animals had no influence on the toxic effects of ergot. Single feeding of ergot to pregnant mice lowered the vitality of the young, but did not affect the mothers. Higher concentration and increase in the number of days of ergot feeding increased the death rate not only among the young, but also among the mothers.

## PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections, see under the appropriate disease)

I. FRANK, P. F., WILCOX, C., & FINLAND, M. (1950.) **In vitro sensitivity of coliform bacilli to seven antibiotics (penicil-**

**lin, streptomycin, bacitracin, polymyxin, aerosporin, aureomycin and chloromyctein.)** —  
J. Lab. clin. Med. **35.** 188-204.

[Abst. from authors' summary and conclusions.]

**2391**

- II. FRANK, P. F., WILCOX, C., & FINLAND, M. (1950.) *In vitro sensitivity of *Bacillus proteus* and *Pseudomonas aeruginosa* to seven antibiotics (penicillin, streptomycin, bacitracin, polymyxin, aërosporin, aureomycin, and chloromycetin).*—*Ibid.* 205-214. [Authors' summary and conclusions copied verbatim.]

**2392**

I. The results of tests for sensitivity to seven antibiotics carried out simultaneously on a number of recently isolated, pathogenic strains of *Esch. coli* have been presented. They serve to indicate the variations in the in vitro activity of these antibiotics with different strains of the same species. The results of similar tests with strains of *A. aerogenes* and *K. pneumoniae* also have been presented.

The most effective antibiotics against all of these organisms were polymyxin and aërosporin and both of these agents were about equally active. Aureomycin and chloromycetin were about equally effective against each of the species and both were appreciably less active than polymyxin and aërosporin. Streptomycin ranked with aureomycin and chloromycetin in its activity against a large proportion of the strains, but there was an appreciable number of strains of each of these organisms that was highly resistant to streptomycin. Penicillin showed the greatest variation in its in vitro effect on the different species of coliform bacilli; it was moderately effective against *K. pneumoniae*, less so against most strains of *Esch. coli*, and essentially inactive against *A. aerogenes*.

On the whole, the strains of *K. pneumoniae* were the most sensitive, those of *A. aerogenes* were the most resistant, while the strains of *Esch. coli* were intermediate in their susceptibility to all seven antibiotics.

II. The results of tests for in vitro sensitivity of a number of recently isolated pathogenic strains of *B. proteus* and *Ps. aeruginosa* to seven antibiotics have been presented.

The most effective against the majority of strains of *B. proteus* were chloromycetin, penicillin, streptomycin, and aureomycin, in that order. However, a significant proportion of the strains were highly resistant to

penicillin and streptomycin, and rather high concentrations of aureomycin were required to inhibit most of the strains. Bacitracin was totally ineffective, and polymyxin and aërosporin were also essentially inactive. *B. proteus* was the only one among the common pathogenic gram-negative bacilli that were studied which was found to be resistant to polymyxin and aërosporin.

Against *Ps. aeruginosa*, aërosporin was the most effective and polymyxin ranked next. Streptomycin was active in moderately high concentrations against a majority of the strains, while a significant proportion were highly resistant to this agent. Aureomycin and chloromycetin were inhibitory in concentrations which, for most of the strains, are outside the range attainable clinically by systematic therapy. Penicillin and bacitracin were essentially without effect.

PRATT, R., & DUFRENOY, J. (1947.) *Cytological mechanisms of penicillin action.*

II. *Changes in reactions of *Staphylococcus aureus* to vital dyes.*—*J. Bact.* 54. 127-133.

**2393**

The first evidence of the drug's effect is failure of the dividing organism to share vacuolar material with its daughter cells. This is followed by failure of these vacuoles to retain their complement of material. These effects are indicated by the loss of the cell's ability to accumulate dye and by dispersion of the vacuolar solution towards the periphery. Lipoids are displaced from cells undergoing lysis and are hydrolysed to fatty acids.—MALCOLM WOODBINE.

DARRASPIN, E., FLORIO, R., & GRATECOS, M. (1948.) *De quelques acquisitions dans le domaine de la penicillinothérapie.*

[*New aspects of penicillin therapy.Rev. Méd. Vét. Toulouse et Lyon.* 99. 97-113, 152-165.

**2394**

A review of penicillin, including synthesis, oral and local usage, delay in its action, conservation of material, association with other therapeutic agents (including sulphonamides and sera), indications and toxicity.—MALCOLM WOODBINE.

SELLERS, K. C., & ALEXANDER, F. (1948.)

*The fate of a sulphonamide, sodium sulphacetamide, in the incubating egg.*—*J. comp. Path.* 58. 138-144.

**2395**

Using eggs of 10-days' incubation with vigorous embryos and examining for viability at 12-hourly intervals, it was found that over 10 mg. % was toxic by the chorio-allantoic route, the LD<sub>50</sub> being 35 mg. %. The compound, chosen because of its solubility, was 75% inactivated within 48 hours, but free drug was still present in the embryo after 72 hours. The intra-allantoic route is not so toxic, because of poorer absorption. The chorio-allantoic route gave higher drug concentrations in the embryo and is, therefore, preferable for chemotherapeutic tests.

—MALCOLM WOODBINE.

CHEN, G., & GEILING, E. M. K. (1948.) The effect of cysteine on the antitrypanosome activity of antimonials. — *J. infect. Dis.* 82. 131-132. 2396

Cysteine, in a concentration of 2 mg. per ml., reverses the antitrypanosome effect of trivalent and pentavalent antimonials, in concentrations of 5-100 mg. per ml. The antimonial compounds were tartar emetic, sodium-antimony thioglycolate, stibamine and neostibosan and *T. equiperdum* was the test organism. By adding the cysteine some time after the antimonial it was found that tartar emetic has an immediate antitrypanosome effect and stibamine has no effect on the glucose metabolism for at least 15 min. These results agree with the toxicological findings.—MALCOLM WOODBINE.

HANSEN, M. F., TODD, A. C., & KELLEY, G. W. (1949.) Continuous phenothiazine therapy for horses. II. Hematological studies with a note on postmortem findings. — *Vet. Med.* 44. 461-464 & p. xx. 2397

Four horses were given respectively 0.5, 1, 2 and 4 g. of phenothiazine daily in their food for about 14 months and haematological examination was made for evidence of toxic action by the drug. No haemotoxic action could be detected at any time: cell count and haemoglobin values remained at or above normal throughout. At the end of the experiments P.M. examination likewise indicated no organotoxic effects attributable to the drug.—J.E.

SPEIRS, R. S., & MEYER, R. K. (1949.) The effects of stress, adrenal and adrenocorticotrophic hormones on the circulating

eosinophils of mice.—*Endocrinology*. 45. 403-429. 2398

The authors discuss improved methods for making eosinophile counts. There was no significant difference in the initial counts in the blood of normal, adrenalectomized or hypophysectomized mice. If normal intact mice were submitted to mild stress or epinephrine injections a marked eosinopenia occurred lasting for approximately seven hours. This was even more marked and prolonged when the stress was increased. The eosinopenia was followed by a slight eosinophilia.

In the adrenalectomized animals only a slight eosinophilia occurred. Eosinopenia could, however, be produced by injections of adrenal cortical extracts, but not by the injection of sex hormones, oils or a small dose of desoxycorticosteroids. The response with the adrenal cortical extract was correlated with the amount of hormone injected.

In the hypophysectomized mice a decrease in the number of eosinophiles occurred, but it was not so marked as in the normal animals. A complete eosinopenia was obtained, however, by the injection of adrenocorticotrophic hormone.

The possible mechanism of the control of the number of circulating eosinophiles is discussed. The changes caused by the exposure of the animals to stress may be used as an indication of the presence or absence of functioning cortical tissue.

—E. EDEN.

HAUGHTON, H. (1950.) Chlorophyll: a preliminary report of its use in two cases of second and third degree burns.—*Med. J. Aust.* March 11th. 337-340. [Author's summary copied verbatim.] 2399

Two cases of burns treated with chlorophyll, one early and the other late, are reported in detail. The rate of healing when chlorophyll is used is so rapid that its inclusion in the armamentarium of burn treatment is suggested; healing occurred in the first case in twenty-nine days, and in the second case in seven days. The burnt surface heals with soft, pliable epithelium, with practically no scarring, and may be ultimately indistinguishable from normal epithelium.

Chlorophyll completely supersedes the sulphonamide compounds as a primary dressing for clean and potentially infected

See also absts. 2174-2178 (mastitis); 2184 (TB.); 2185 (streptomycin, sulphone, PAS); 2187 (surface-active agents in aerosol streptomycin against TB.); 2188 (chemotherapy in TB.); 2194 (leprosy); 2197 (pasteurellosis); 2210-2212 (chloramphenicol in typhoid fever); 2213-2214 (brucellosis); 2221-2224 (suliyuk); 2225 (bovine leptospirosis); 2230 (dourine); 2231 (*T. equiperdum* infection in rats); 2233 (antrypol); 2238 (bovine coccidiosis); 2246 (bovine anaplasmosis); 2282 (an *Actinomyces*, antibiotic in dog distemper); 2302 (dog rickettsiosis); 2312 (gammexane); 2313 (roteneone and benzene hexachloride); 2320 (strongylosis); 2322 (oesophagostomiasis); 2323 (stomach worms); 2324 (quaternary ammonium); 2362 (bloat); 2366 (cobalt therapy in sheep pregnancy toxæmia); 2368 (goitre in goats); 2461 (antibiotics).

## PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

BRODY, S. (1948.) Environmental physiology with special reference to domestic animals. I. Physiological backgrounds.—*Res. Bull. Miss. agric. Exp. Sta.* No. 423. pp. 3-43. 2400

An outline of what is known concerning the effect of climate on domestic animals is given together with an account of the type of body temperature regulating mechanism adopted by different species. There is no doubt that little exact information is available, but with the setting up of a Climatic Laboratory in Columbia, Missouri, the layout of which is described, it is hoped to obtain information on such questions as the effect of temperature and humidity on production, the most suitable farm shelters, etc., as well as more fundamental information such as the way in which climate affects individuals and individual system of the body.—J.A.N.

KUPCIK, V. (1948.) Urvování stáří porazného skotu podle osifikace obratlu, jmenovite kosti krizové. [Ossification of the sacrum as an indication of age in cattle.]—*Cas. československ. Vet.* 3. 505-506. 2401

K. discusses the estimation of age in Czech cattle according to the degree of fusion of the sacral vertebrae. In the newborn calf the five sacral vertebrae are separate, joined only by cartilaginous intervertebral discs. During the first 12-18 months of age ossification of the discs between the second, third and fourth vertebrae takes place. At the age of about two years, ossification between the first and the second vertebrae takes place. At this stage the thickness of the cartilage between the fourth and the fifth vertebrae is about 5 mm. At three years the thickness of the cartilage is reduced to 1-3 mm. At four years, ossification of the disc between the fourth and fifth vertebrae is completed. At five years there is com-

wounds. Chlorophyll is a powerful deodorant.

plete fusion of the first four vertebrae. At six years and over the sacrum is in one piece.

—E.G.

HOCHSTER, R. M., & QUASTEL, J. H. (1949.) Diethyl stilbœstrol as a competitive intracellular hydrogen carrier.—*Nature, Lond.* 164. 865-867. 2402

Tissue metabolism experiments are described which indicate that diethylstilbœstrol will act as a hydrogen carrier in some biological oxidations and may compete with other hydrogen carriers in the cell. In this way diethylstilbœstrol may, in some circumstances, act as a respiratory catalyst, in other circumstances as a respiratory poison. It is suggested that the physiological and therapeutic effects of diethylstilbœstrol may find an explanation in its behaviour as a competitive hydrogen carrier.

—A.T.C.

SARKAR, B. C. R. (1948.) Carotene and vitamin A in the colostrum of cows of typical Indian breeds.—*J. Dairy Sci.* 31. 479-487. 2403

Samples of colostrum and milk were collected from nine Haryana cows and one heifer and from five Sahiwal heifers, which were given a dairy mixture and roughage. Collections were made daily for eight days following parturition. Vitamin A was estimated spectrophotometrically, and carotene colorimetrically. On the first day the average percentage composition of the colostrum was as follows: Fat, 4.37; solids not fat, 18.37; protein, 13.16; ash, 1.028. The change from colostrum to milk was gradual and was practically complete by the fourth day, when the corresponding values were 5.72; 9.63; 5.30 and 0.821. On the first day the colostrum contained, per 100 ml., 33.6-153.9, mean 85.5 micron g. of carotene, and 63.2-571.8, mean 313.4 micro g. of vitamin A. On the eighth day corre-

sponding mean values were 19.7 and 70.9 micro g. Colostral fat contained 6-7 times as much carotene and vitamin A as normal milk fat. Heifers secreted more of the vitamin in the colostral fat than did the cows.

—E. M. CRUICKSHANK.

HUMPHREY, G. F., & MANN, T. (1949.) **Studies on the metabolism of semen. 5. Citric acid in semen.** —*Biochem. J.* **44.** 97-105. **2404**

Citric acid in semen may occur in concentrations of up to 1%. There is no correlation between fructose and citric acid concentrations, and these two compounds are not always formed in the same part of the gland. However, like fructose, citric acid production is inhibited by castration and restored by testosterone. Fresh semen incubated *in vitro* metabolizes citric acid both aerobically and anaerobically, but the compound is unable to maintain the respiration of washed spermatozoa. The possible role of citric acid in the phenomena of spontaneous gel formation, coagulation and liquefaction of semen which normally occur in some species, is discussed.—P. H. HERBERT.

FOLLEY, S. J., & FRENCH, T. H. (1949.) **The intermediary metabolism of the mammary gland. 2. Respiration and acid production of mammary tissue during pregnancy, lactation and involution in the rat.** —*Biochem. J.* **45.** 270-275. **2405**

The metabolic rate of rats' mammary tissue slices was increased with the onset of lactation and was correlated with the subsequent progressive increase in milk yield. Increased respiration rather than glycolysis provided the extra energy for this process. A simultaneous increase of the respiratory quotient suggested the synthesis of fat from oxygen-rich materials. The changes in metabolism subsequent to weaning were in the opposite direction from those which occurred at parturition. The possible mechanism of fat synthesis in the mammary gland and its hormonal control are discussed.—E. EDEN.

KAPLAN, M. H., & SPINK, W. W. (1948.) **Studies of the staphylocoagulase reaction: nature and properties of a plasma activator and inhibitor.** —*Blood.* **3.** 573-585. [Authors' conclusions copied verbatim.] **2406**

Dried human plasma and human plasma which has been stored in the frozen state for long periods are not readily clotted by coagulase. Fibrinogen which is sufficiently purified is entirely insusceptible to clotting by coagulase. However, all three substrates—dried human plasma, frozen plasma, and dried human fibrinogen—are readily clotted by coagulase on admixture of a plasma factor.

This accessory substance, referred to as activator, is precipitated from normal human plasma at 60 to 100 per cent. saturation with ammonium sulfate. However, it is not present in purified serum albumin preparations, but does occur in alcoholic fractions which largely contain alpha and beta globulins. Activator is a comparatively stable protein which resists heating at temperatures below 100°C., but is destroyed by pepsin or nitrous acid.

A substance inhibiting the coagulase was found present in many samples of normal human plasma. It was associated with the globulin fraction. It was also present in the normal plasma of the guinea pig, but was deficient in rabbit plasma. The inhibitor substance acts independently of activator and is therefore believed to inhibit the clotting reaction by its action on coagulase. Either the presence of this inhibitor or a deficiency of activator may be responsible for the failure of coagulase to clot the plasmas of some individuals and of certain animal species.

RATNOFF, O. D., HARTMANN, R. C., CONLEY, C. L. (1950.) **Studies on a proteolytic enzyme in human plasma. V. The relationship between the proteolytic activity of plasma and blood coagulation.** —*J. exp. Med.* **91.** 123-133. [Authors' summary copied verbatim.] **2407**

A fraction of globulin was prepared from human plasma which was deficient in prothrombin, thrombin, fibrinogen, plasma thromboplastin, and accelerator globulin. The preparation of globulin contained considerable potential proteolytic activity which could be activated by streptococcal fibrinolysin. This fraction of globulin accelerated the clotting of normal platelet-deficient plasma. However, the clot-accelerating effect of the globulin fraction was the same whether or not its proteolytic property had

been activated.

The addition of streptococcal fibrinolysin to normal platelet-deficient plasma did not accelerate coagulation. Nor did the addition of streptococcal fibrinolysin to hemophilic platelet-deficient plasma promote its coagulation.

The data presented suggest that proteolysis by activated plasma proteolytic enzyme is not an essential stage in the coagulation of the blood.

BATTLE, W. D., CAPPS, R. T., ORTH, O. S., & MEYER, O. O. (1950.) **The effects of 4-hydroxycoumarin anticoagulant No. 63 upon the prothrombin time in dogs and human beings.** — *J. Lab. clin. Med.* 35. 8-15. [Authors' summary copied verbatim.] **2408**

Some effects on the prothrombin time in dogs and human beings of the 4-hydroxycoumarin product No. 63 [2-methyl-2-methoxy - 4 - phenyl - 5-oxodihydropyrano-(3, 2-c) (1) benzopyran] have been established. Some similarities to and differences from Dicumarol have been ascertained. Desired distinct advantages over Dicumarol have not been proved as yet. Further investigation will be necessary to evaluate this compound more fully.

PORTMANN, A. F., & HOLDEN, W. D. (1949.) **Protamine (salmine) sulphate, heparin and blood coagulation.** — *J. clin. Invest.* 28. 1451-1458. [Authors' summary copied verbatim.] **2409**

Protamine sulphate administered intravenously in doses up to 100 mg. in humans has no effect upon the clotting time of whole blood. Protamine sulphate had no effect as a local hemostatic agent in dogs. In relatively low concentrations in inactivated serum, protamine has a clot-accelerating effect on a thrombin-fibrinogen mixture after incubation of the thrombin with protamine. The antagonism to heparin was demonstrated *in vitro* and *in vivo*. In the presence of serum or whole blood, the protamine-heparin ratio at neutralization was 18 : 1. An excess of either caused prolongation of the coagulation time. When present in whole blood in concentration insufficient to cause complete inactivation of fibrinogen, the anticoagulant effect of protamine is due to its interference with the conversion of prothrombin to thrombin. This

antiprothrombic effect is not apparent in the presence of an excess of thromboplastin. An antithromboplastic action of protamine sulphate could not be demonstrated. Protamine does neutralize the serum heparin cofactor.

NIEDERMEIER, R. P., SMITH, V. R., & WHITEHAIR, C. K. (1949.) **Parturient paresis. III. A study of various blood constituents at parturition in mastectomized cows.** — *J. Dairy Sci.* 32. 927-934. **2410**

That there is a decrease in the blood calcium and inorganic phosphorus at the time of parturition which if accentuated may lead to parturient paresis is now fairly well established. In order to obtain further information on this point, analyses of the blood calcium, inorganic phosphorus, magnesium and fat were made with blood from five mastectomized and five control cows. The blood samples were taken daily for five days *pre-partum* and five days *post-partum* and three times on the day of parturition. The control animals had a distinct *post-partum* fall in calcium, inorganic phosphorus and fat with a rise in blood magnesium. On the other hand in the mastectomized cows the blood calcium, magnesium and fat remained more or less constant throughout. As in the control animals, however, there was a fall in inorganic phosphorus. It is suggested that the muscular effort entailed in parturition is responsible for causing the lower inorganic phosphorus seen in both groups.—J. A. NICHOLSON.

STEWART, W. B., STEWART, J. M., IZZO, M. J., & YOUNG, L. E. (1950.) **Age as affecting the osmotic and mechanical fragility of dog erythrocytes tagged with radioactive iron.** — *J. exp. Med.* 91. 147-159. [Authors' summary copied verbatim.] **2411**

Radioactive iron was administered to three normal dogs, two of which had previously been bled, in order to tag a group of erythrocytes of approximately known age.

The osmotic fragility of the newly formed tagged cells was significantly greater than that of the general cell population during the first few days after injection of the iron, while the mechanical fragility of the young cells was less than that of the general red cell population. As the cells aged

and approached the end of their life span, their susceptibility to destruction by trauma inflicted by rolling glass beads exceeded that of the general cell population. The osmotic behaviour of the old cells was not distinctive.

The increased mechanical fragility of senescent cells suggests that the life span of erythrocytes may be limited at least in part by changes within the cell which render it more susceptible to destruction by mechanical wear and tear in the circulation. It is emphasized, however, that the trauma produced by rolling glass beads may be quite unlike that inflicted upon red cells *in vivo*.

A decrease in circulating radioactive iron was observed in each experiment soon after the mechanical fragility of the tagged cells began to exceed that of the total cell population. The lowest point on the curve representing circulating radioiron was noted at 119, 119, and 122 days respectively after injection of iron in the three experiments. Estimates of the life span of dog erythrocytes obtained in this way agree with those provided by other methods.

DOUGHERTY, J. H., & DOUGHERTY, T. F. (1950.) Acute effect of 4-aminopteroyl-glutamic acid on blood lymphocytes and the lymphatic tissue of intact and adrenalectomized mice.—*J. Lab. clin. Med.* 35. 271-279. [Authors' summary copied verbatim.] **2412**

The lymphopenia and acute atrophy of lymphatic tissue which were observed following administration of a lethal dose of 4-aminopteroylglutamic acid to mice did not occur when the animals were adrenalectomized prior to treatment. Therefore, it is suggested that these changes in lymphatic structures are probably hormonally mediated because of the nonspecific toxic action of the compound and the resulting stimulation of the pituitary and adrenal cortical secretions. This is substantiated by the observation that adrenal cortical hypertrophy and depletion of adrenal sudanophilic material followed the injection of a large dose of Aminopterin. However, the lymphocytosis and hypertrophy of the thymus characteristically observed after adrenalectomy were not found in the adrenalectomized Aminopterin-treated animals. It is probable, therefore, that this compound has both an indirect hormonally mediated

as well as a direct inhibitory action on the lymphatic system.

In contrast to this dual action of Aminopterin on the lymphatic system, the effect of this drug on myelopoiesis was not mediated wholly or in part by pituitary and adrenal cortical secretion.

WANG, K. J., GRANT, R., JANOWITZ, H. D., & GROSSMAN, M. I. (1950.) Action of lysozyme on gastrointestinal mucosa.—*Arch. Path.* 49. 298-306. [Authors' summary and conclusions copied verbatim.] **2413**

Lysozyme produces erosions and hemorrhages in the gastric and colonic mucosa of rats and increases the injurious action of hydrochloric acid and pepsin *in vivo*. When sections of dog and cat stomach are incubated in lysozyme, vacuolation of the mucus of the surface epithelial cells and disorganization of both the surface epithelial cells and the neck mucoid cells occur. Lysozyme does not decrease the viscosity of gastric mucus, nor does it cause disintegration or disaggregation of surface epithelial cells suspended in mucus, or render them more susceptible to acid-pepsin action. The mechanism of the injurious action of lysozyme has not been satisfactorily explained.

REID, J. T., & HUFFMAN, C. F. (1949.) Some physical and chemical properties of bovine saliva which may affect rumen digestion and synthesis. —*J. Dairy Sci.* 32. 123-132. **2414**

Analyses of 77 samples of salivary secretion from 42 cattle indicated that the average pH of saliva collected under oil was pH 8.71, but unprotected saliva had a pH of 8.5. The average water content was 99.12% and the surface tension 47.10 dynes per cm. These findings explain the excellent wetting properties of saliva. An average ascorbic acid content of 0.15 mg.% was found so that with an average secretion of 56 l. per 24 hours, it represents a daily loss of 86 mg. ascorbic acid. The excretion of this substance did not appear to bear any relationship to the plasma ascorbic acid level and whilst its significance is obscure, sufficient would be swallowed to influence the biological systems of the rumen. Saliva was found to possess typical adsorption tendencies, probably because of the mucoid proteins it contains. This accounts for its

deodorizing properties, no characteristic odour being observed when garlic was suspended in the saliva.—J. A. NICHOLSON.

I. GALL, L. S., BURROUGHS, W., GERLAUGH, P., & EDGINGTON, B. H. (1949.) **Special methods for rumen bacterial studies in the field.** — *J. Anim. Sci.* **8.** 433-440. **2415**

II. GALL, L. S., BURROUGHS, W., GERLAUGH, P., & EDGINGTON, B. H. (1949.) **Rumen bacteria in cattle and sheep on practical farm rations.** — *Ibid.* **441-449.** **2416**

I. & II. In the first of these studies a field laboratory for the collection of rumen samples is described with emphasis on the rapid and careful handling needed for the successful culture of anaerobic micro-organisms. Techniques of withdrawal and handling are discussed in detail. In the second study the results from 21 cattle and 12 sheep on winter rations and from 11 cattle and six sheep on pasture are recorded. Bacterial counts from the animals on winter rations averaged 50 billion and from those on pasture 96 and 85 billion (per gram fresh rumen contents) in cattle and sheep respectively. There was little difference in the bacterial pattern, examined by Gram-staining on cultural methods, between cattle and sheep on summer and winter feeding. A few more forms were noted in animals on summer rations and more fast-growing organisms were noted when more grain was being fed.—P. H. HERBERT.

LOOSLI, J. K., WILLIAMS, H. H., THOMAS, W. E., FERRIS, F. H., & MAYNARD, L. A. (1949.) **Synthesis of amino acids in the rumen.** — *Science.* **110.** 144-145. **2417**

Feeding experiments with three sheep and two goats using purified diets containing urea as the sole source of nitrogen indicated that the loss of amino acids in the urine and faeces greatly exceeded the amount of amino acids provided by the diet. Moreover, the animals stored nitrogen and gained in weight so that synthesis of amino acids must have taken place in the rumen. Analyses of rumen contents indicated that the ten essential amino acids were synthesized in the rumen.—J. A. NICHOLSON.

TRETHEWIE, E. R., & DAY, A. J. (1949.) **Ease of release of histamine from the**

**lungs of guinea-pigs.** — *Aust. J. exp. Biol. med. Sci.* **27.** 417-421. [Authors' summary slightly amended.] **2418**

The output of histamine from the perfused lungs of guinea-pigs after the injection of trypsin is shown to be many times greater in proportion to the weight of the animal in the case of new-born g. pigs compared with g. pigs ten or eleven weeks old. The possible significance of this finding is discussed.

AMOROSA, E. C., HANCOCK, J. L., & ROWLANDS, I. W. (1948.) **Ovarian activity in the pregnant mare.** [Correspondence.] — *Nature, Lond.* **161.** 355-356. **2419**

The corpus luteum of the pregnant mare is short-lived and regresses at the end of the first month. Follicular development occurs during pregnancy and reaches a peak during the second and third months of pregnancy (*i.e.*, when the gonadotrophin concentration is maximal in the blood). It has now been shown that ovulation occurs in a high proportion of pregnant mares. One or more ova were recovered from the fallopian tubes of 9 of 14 mares examined at autopsy at the 46th-73rd days of pregnancy. The ovaries of all these 14 mares contained one or more fully formed corpora lutea, 22 being in the ovaries of the left side and 18 in the ovaries of the right side. Examination of 24 mares during 45 oestrous cycles revealed that ovulation occurred more frequently in the left ovary (35 left, 19 right). In a series of 20 pregnant mares, foetal migration occurred in ten, the direction in all cases being from the left to the right horn. Attempts in two mares to fertilize the ova forming during early pregnancy were unsuccessful.

—ALFRED T. COWIE.

ASDELL, S. A., ALBA, J. DE, & ROBERTS, S. J. (1949.) **Studies on the estrous cycle of dairy cattle: cycle length, size of corpus luteum, and endometrial changes.** — *Cornell Vet.* **39.** 389-402. **2420**

The duration of the oestrous cycle was observed in 17 Holstein and Guernsey heifers over a period of about a year. In all, 167 cycles were studied. Statistical examination of the data showed a distinct mode at 20 days; no significant seasonal effects on the length of the cycle were noted. Eighteen heifers were ovariectomized at various times in the oestrous cycle and the

corpora lutea examined. Four corpora lutea were found to have hollow centres containing fluid, but this feature is believed to be of no physiological significance. The ratio of cell length to nucleus varied in an orderly manner both in the endometrial epithelial cells and the gland cells. The ratio was about 4 : 1 just before oestrus, 2 : 1 at oestrus, and it continued to decrease for the next two days, thereafter it gradually increased throughout the diœstrous period. Changes in the degree of œdema, hyperæmia and glandular development throughout the cycle were also studied. Studies on ovariectomized heifers proved that the cyclic endometrial changes could be produced by suitable injections of œstrogen and progesterone.—ALFRED T. COWIE.

HANSEL, W., ASDELL, S. A., & ROBERTS, S. J. (1949.) The vaginal smear of the cow and causes of its variation.—*Amer. J. vet. Res.* **10.** 221-228. **2421**

Smears stained by Shorr's technique from the cervical and vestibular ends of the vagina were examined throughout the oestrous cycle in six normal heifers. The cells were classified into five types and differential counts were made. Smears were also studied in four ovariectomized heifers following injections of œstrogen and progesterone. The site of origin of the cells found in smears was studied by staining sections of the vaginal mucosa by the same technique. The growth wave of the vaginal epithelium was never sufficiently great to result in extensive cornification of the superficial cells. The percentage of cornified cells increased 3-5 days after oestrus. A second growth wave resulted in another rise in the numbers of cornified cells 9-16 days after oestrus. The percentage of cornified cells did not usually rise above 50.

—ALFRED T. COWIE.

LI, C.-F., & STACEY, M. (1949.) Acid degradation of sperm deoxyribonucleic acid. [Correspondence.]—*Nature, Lond.* **163.** 538. **2422**

Treatment of spermatozoa deoxyribonuclei acid with 1.5% methanolic hydrogen chloride at room temperature caused the purine bases to pass into solution, leaving a residue with the properties of a methyl derivative of thymic acid. Further treatment with increasing acid concentrations gave a

series of fractions in which the presence of guanine, adenine, 'sperm guanosine,' 'sperm adenylic' acid and deoxyribose phosphate was indicated. The final residue consisted almost entirely of 'sperm thymylic acid.' The authors' findings do not agree with a simple tetranucleotide repeating unit in the structure of spermatozoa deoxynucleic acid. They do confirm that the ease of liberation of sugar aldehyde groups is compatible with cytological identification of deoxynucleic acid by the use of Feulgen's reagent.

—P. H. HERBERT.

MANN, T., & LUTWAK-MANN, C. (1948.) Studies on the metabolism of semen. IV. Aerobic and anærobic utilization of fructose by spermatozoa and seminal vesicles.—*Biochem. J.* **43.** 266-270. **2423**

Fructolysis is the most important method of energy production in mammalian spermatozoa under both ærobic and anærobic conditions. When it is abolished by a concentration of NaF which only partially inhibits respiration the spermatozoa are non-motile. Anærobically washed spermatozoa can use added fructose or glucose to the same extent, unlike the seminal vesicle which can use only glucose. Aerobically both spermatozoa and seminal vesicles can use either glucose or fructose.

—P. H. HERBERT.

McDOUGALL, E. I. (1949.) The composition of foetal fluids of sheep at different stages of gestation.—*Biochem. J.* **45.** 397-400. **2424**

Allantoic and amniotic fluids were obtained at five regular intervals during the gestation of ewes. Specific gravity, dry matter, ash, total and non-protein nitrogen, pH and the principal anions and cations of physiological interest were determined. The composition of amniotic fluid did not vary very much, being similar to that of the maternal serum; it may be a transudate of the latter. The chemical differences between the amniotic and allantoic fluids may result from the action of the digestive tract and kidneys of the foetus.—E. EDEN.

SCHULTZE, A. B., & TURNER, C. W. (1948.) Relation of endocrine gland weight to body weight in growing and mature female dairy goats.—*Res. Bull. Miss agric. Exp. Sta.* No. 427, pp. 322. **2425**

It has been observed that the growth rate of individual organs may not be in direct proportion to the increase in body weight. It was thought, therefore, that a study of the relative change in size of an organ may be a suitable means of assessing its activity and, particularly with endocrine organs, provide a guide as to the hormone dosage necessary at different body weights. A study of the growth rates of various organs from normal goats showed that the pituitary body and ovaries increase more rapidly than the body weight whereas the adrenals, parathyroids and pancreas increase at approximately the same rate and the liver and thyroids at three-quarters the body weight rate, the lowest rate being that of the kidneys.—J. A. NICHOLSON.

PASCHKIS, K. E., CANTAROW, A., EBERHARD, T., & BOYLE, D. (1950.) **Thyroid function in the alarm reaction.** — *Proc. Soc. exp. Biol., N.Y.* **73.** 116-118. **2426**

One hundred and six male rats were injected intraperitoneally with radio-active iodine 131 in the form of sodium iodide and killed four hours afterwards. The uptake of the radio-active material per mg. of thyroid tissue was used as a criterion of thyroid function. In those that had previously been injected intramuscularly with 10% of formalin there was a diminished uptake. Pre-treatment with desoxycorticosterone acetate or adrenal cortical extract did not seem to counteract the effect of formalin.—E. EDEN.

GAUDINO, M., & LEVITT, M. F. (1949.) **Influence of the adrenal cortex on body water distribution and renal function.** — *J. clin. Invest.* **28.** 1487-1497. [Authors' summary copied verbatim]. **2427**

Simultaneous measurement of extracellular fluid volume (inulin space), total body water ( $D_2O$  space), intracellular fluid volume (by calculations),  $Na^{24}$  and  $K^{42}$  volumes, plasma volume, thiocyanate space and renal function ( $C_{In}$ ,  $C_{PAH}$ ,  $Tm_{PAH}$  [inulin clearance, *p*-aminohippuric acid clearance and maximal tubular excretory capacity for *p*-aminohippurate.—Ed. *V.B.*] were made in dogs during treatment with desoxycorticosterone acetate (DCA) (three dogs), adrenal cortical extract (three dogs) and during progressive adrenal insufficiency (two dogs).

DCA caused a decrease in intracellular fluid volume and an expansion of the extracellular space.  $C_{In}$  and  $C_{PAH}$  increased during therapy while  $Tm_{PAH}$  decreased. The intracellular concentrations of sodium and potassium were both elevated at the peak of response to therapy. Cortical extract caused an increase in intracellular fluid volume with no alteration in the extracellular space. No consistent influence on renal function was observed during extract treatment. During adrenal insufficiency, the intracellular volume increased while the extracellular space decreased.  $C_{In}$   $C_{PAH}$ ,  $Tm_{PAH}$  decreased. The relative constancy of the plasma volume as compared to much greater variations in the extracellular space indicates that plasma volume is not a sensitive index of alterations in the latter. Thiocyanate space does not follow the extracellular space as measured by inulin. The effects of DCA and cortical extract in the intact animal are transient, all physiological variations observed tending to return towards normal despite continued treatment.

COWIE, A. T., FOLLEY, S. J., FRENCH, T. H., & GREENBAUM, A. L. (1949.) **Further observations on the effects of adrenalectomy on lactating rats studied by the paired-feeding technique.** — *J. Endocrinol.* **6.** No. 1. pp. ii-iii of Proceedings. **2428**

Adrenalectomy of lactating rats resulted in a lowered arginase activity of the mammary gland, liver and kidneys. These effects were not observed in sham-operated and pair-fed control rats. Lowered oxygen consumption and respiratory quotient of the tissue slices were, however, noted in both groups; this was probably a result of anorexia.—E. EDEN.

STROBINO, L. J., & FARR, L. E. (1949.) **The relation to age and function of regional variations in nitrogen and ash content of bovine bones.** — *J. biol. Chem.* **178.** 599-609. **2429**

The nitrogen content of bones of cattle decreased with increasing age, whereas the ash content increased. The nitrogen and ash content of the various regions of the bones was also correlated with age; lowest nitrogen and highest ash figures were found near the centres of ossification. The composition of bone was more uniform in older

than in young animals.—E. EDEN.

CAIN, A. J. (1950.) **The histochemistry of lipoids in animals.** — *Biol. Rev.* 25. 73-112. 2430

The constitution of the various lipoids found in animal tissues is described. Next the criteria of validity of histochemical tests are discussed. A short description of the

*See also abst. 2351 (lactation in rats); 2364 (parturition and physiology of cows); 2440 (metabolism of semen); 2471 (book, endocrinology); 2472 (textbook, physiology); 2473 (book, food biochemistry); 2475 (book, mental and physical pain).*

### PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

WEBER, G. R. (1950.) **Effect of concentration and reaction (pH) on the germicidal activity of chloramine-T.** — *Publ. Hlth. Rep., Wash.* 65. 503-512. [Author's summary copied verbatim]. 2431

A study has been made to determine the concentration of available chlorine introduced as chloramine-T which is bactericidally equivalent to 50 ppm av. Cl. introduced as hypochlorite, as prescribed in the Milk Ordinance and Code and also the Ordinance and Code Regulating Eating and Drinking Establishments as recommended by the Public Health Service. The pH as well as the concentration of available chlorine should be determined in order to prescribe exposure periods for germicidal treatment of utensils with chloramine-T. Generally, considerably longer exposure periods are required for chloramine-T than are necessary for hypochlorite. Concentrations of chloramine-T of at least 250 ppm at a reaction not greater than about pH 7.0, or 500 to 1,000 ppm at reactions not more alkaline than pH 7.5, would appear to be as rapid in germicidal action (in the absence of organic matter) as 50 ppm of the slower (alkaline) hypochlorites. Commercial chloramine-T products generally are not adjusted to such a low pH, and there is some doubt as to the feasibility of using a chlorine germicide of such low pH.

BOGDANOV, B. (1947.) **[Five-year veterinary plan.]** — *Veterinariya, Moscow.* 24. No. 1. pp. 1-5. 2432

The overall objects are to increase the number of horses by 56%, cattle by 39%, sheep and goats by 75% and pigs to three times their numbers in 1945. Poultry are

state of lipoids in the living tissues is also given. The review is, however, mainly concerned with a detailed description of actual histochemical tests for lipoids. The validity of these tests under varying conditions is discussed and other substances that interfere are also mentioned. Finally a useful key for the histochemical analysis of lipoids is given.—E. EDEN.

also to be considerably increased by a large-scale expansion of incubation and rearing centres. Particular attention is to be paid to the regions overrun by the German Forces in the late war and, generally, animal husbandry developed efficiently.

The veterinary side is to follow a parallel expansion. During the war work in the civil veterinary centres deteriorated considerably. Of first importance will be the establishment, covering the whole country, of properly equipped centres and travelling clinics, all under the supervision of regional heads. The efficiency of the staffs is to be raised by improved training and selective postings. Stables, byres, pastures and watering places are to be regularly inspected and buildings disinfected at least twice a year. The allocation of drugs and vaccines is to be simplified and the stocks in the centres periodically inspected.—F.A.A.

ANON. (1947.) **[Progress in the veterinary services.]** — *Veterinariya, Moscow.* 24. No. 3. pp. 1-4. 2433

In the past, neglect of many phases of veterinary work had resulted in unnecessarily high losses amongst stock. As an example, the incidence of disease in a given region in 1946 is quoted as 73.2% of all horses, 19.6% of cattle, 11.6% of sheep and goats and 21% of pigs. Of all animals dealt with in the U.S.S.R. 80% had non-infectious diseases, the alimentary tract being affected in 34.2% and the respiratory tract in 25.7%; 93% of deaths among horses were from non-infectious diseases.

The current veterinary plan therefore envisaged the increase, even by the end of 1947, of the number of horses in the

U.S.S.R. to 11.9 million, cattle to 52 million, sheep and goats to 84.7 million and pigs to 13.4 million. To attain these objectives, the administrative efficiency and the hygienic condition of the 3,912 veterinary clinics, the 4,909 main and 13,120 subsidiary dispensaries required improvement. Greatly improved feeding, the provision of dry, hygienic stabling; and of intelligent management are other essentials suggested. The larger farms should possess their own first-aid equipment and emergency segregation stalls.—F.A.A.

**STAUFFER, V. D. (1947.) Animal disease control investigations in Peru.** pp. 108. Washington: Food Supply Division, The Institute of Inter-American Affairs. 2434

The Servicio Cooperativo Inter-American de Producción de Alimentos (SCIPA) is a branch of the Peruvian Ministry of Agriculture created in May, 1943, as a result of a co-operative agreement between the Institute of Inter-American Affairs (IIAA) and the Peruvian Ministry of Agriculture. It carries out a country-wide programme in Peru designed to increase the production of essential food products and to promote the general agricultural development necessary to aid the Republic of Peru to become reasonably self-sufficient in her food supplies. SCIPA maintains 31 offices in 19 of the 23 political departments of Peru with a staff of 225 experts.

The programme of work began in 1943 when Dr. V. D. Stauffer of the U.S.A. joined

See also absts. 2207 (duck eggs); 2254 (cow pox).

## LIVESTOCK HYGIENE

**VAN RENSBURG, J. A. (1949.) Fitting animal production in the Union into the soil conservation pattern. — *Bull. agric. Congo belge.* 40. 1859-1872. [In English.] 2435**

During the early years of European colonization in South Africa land was abundant and increased productivity was attained by the progressive utilization of fresh tracts of virgin soil. After a time no new areas for cultivation were available and land deterioration commenced.

This paper deals with the methods

See also absts. 2331, 2337, 2338, and 2339 (grazing, pastures and pasture plants); 2431 (germicide chloramine-T); 2432-2433 (in the U.S.S.R.); 2476 (book, diseases of sheep); 2477-2478 (books, diseases of poultry).

the IIAA and SCIPA staffs as veterinarian and became responsible for parasitic and disease control. In 1946 progress was severely hampered by a lack of published material and research data concerning animal diseases.

Attempts to supply the most pressing needs led to work ranging from routine veterinary services, consultations, surgery, vaccinations, treatments and emergency disease investigations. Emergency disease investigations undertaken by SCIPA have been concerned with anthrax, blackleg, bovine trichomoniasis, anaplasmosis, piroplasmosis, foot and mouth disease, and many others, along with the publication of technical bulletins and scientific articles. As the quantity of vaccines and drugs produced in Peru were insufficient, arrangements were made to import these from America.

The most urgent study was considered to be parasitism and a long list of parasites identified in Peru is included. The Report includes as appendixes some excellent papers on disease prevention and control, such as The Use of D.D.T. against Animal Pests, Bovine Genital Trichomoniasis, Piroplasmosis and Anaplasmosis, Liver Fluke disease, the Use of Minerals for Livestock, Rules for calf-rearing and the Poultry Industry and others. The Report is well illustrated by numerous photographs of various phases of the livestock industry and animal husbandry in Peru.

—D. S. RABAGLIATI.

adopted to raise productivity by more efficient land utilization in areas where overstocking, cash-crop economy, and attempts to introduce and maintain exotic breeds of cattle ill suited to the particular conditions of the Union have brought agriculture to the edge of disaster. The author lays emphasis on the knowledge that no measures which disregard the inter-relationships between climate, soil, vegetation and stock can bring about improvement in worn-out soils and pastures.—S. BRIAN KENDALL.

## REPRODUCTION AND REPRODUCTIVE DISORDERS

LORIGA, G. (1948.) Centro di fecondazione artificiale Arborea della società delle bonifiche Sarde. [The Arborea artificial insemination centre of the Sardinia herd improvement society.] — *Zootec. Vet., Milan.* 3. 173-177. 2436

L. described the work done at the Arborea artificial insemination centre after the first year of activity. Besides artificial insemination, the work included treatment of sterility in cows, herd improvement by selection, and control of infectious diseases affecting the genital organs.—B. BALDELLI.

DE VUYST, A., & VERVACK, W. (1949.) L'entretien de l'ardeur génésique chez les taureaux utilisés pour l'insémination artificielle. [Maintainence of sexual activity in bulls used for artificial insemination.] — *Ann. Méd. vét.* 93. 292-293. 2437

At times bulls used for artificial insemination lose their sexual activity. For this reason, the operator must always avoid rough handling and pay attention to the adjustment of the artificial vagina. This should be removed if ejaculation does not occur when it is first put on and its temperature and tension must be adjusted to the individual bull. In some cases it has been found that a bull will mount another bull in preference to a cow. The administration of vitamin E has been successful in restoring sexual activity as well as the quality of the semen in certain cases.

—J. A. NICHOLSON.

ROTHSCHILD (1949.) Measurement of sperm activity before artificial insemination. [Correspondence.] — *Nature, Lond.* 163. 358-359. 2438

R. has demonstrated that in fresh bull and ram semen there are electrical impedance periodic changes which can be recorded graphically in brief time, on an oscilloscope, using platinum electrodes which may be dipped in as small an amount as 0.5 ml. semen. There is evidence that the frequency ("spikes per minute") of the readings corresponds to the density/motility level of the sample as evinced by the wave motion phenomenon. Thus the subjective element in the estimation of the value of a sample by the latter criterion may be

eliminated, and photographic records kept. Correlation attempts between oscilloscope readings and conception rates from given samples are in progress.—F. L. M. DAWSON.

ALMQUIST, J. O., PRINCE, P. W., & REID, J. J. (1949.) Bacteriological studies of bovine semen. I. Numbers of bacteria and the relation to fertility.—*J. Dairy Sci.* 32. 543-548. 2439

This paper deals with the numbers of bacteria commonly found in bull semen and the relationship between the average count and the fertility level of bulls used for routine artificial insemination. Routine collection measures were used, strict asepsis was not observed, but reasonable precautions were taken to avoid gross contamination. There was a very wide range in bacterial plate counts of semen from various bulls, and in the same bulls at various times. The plate counts on 202 ejaculates from 36 bulls ranged from less than 100 to more than three million organisms per ml., with an average of 200,000 per ml. There was no significant difference between the first and second ejaculates from the same bull, nor was there any apparent relation with fertility or age of bulls.—G. V. LAUGIER.

ROMIJN, C. (1950.) De invloed van eidooier op het metabolisme van stierensperma. [Egg yolk and metabolism of bull semen.] — *Tijdschr. Diergeneesk.* 75. 95-109. [Abst. from English summary.] 2440

The influence of fresh egg yolk on the oxygen consumption of bull spermatozoa was studied in a large number of semen samples, varying in several aspects, e.g. number of spermatozoa, consistency, pH, etc. The quantitative activation of the oxygen consumption was interpreted mathematically.

A distinct correlation exists between the oxygen consumption of the spermatozoa, calculated per thousand million of cells, with and without addition of egg yolk.

No correlation could be established between the consistency of the ejaculate (number of cells per unit ml.) and the oxygen consumption per  $10^9$  cells.

HERRICK, J. B. (1950.) The effect of homogenization, pasteurization, and lyophiliza-

**tion on egg-yolk sodium citrate diluents for bull semen.**—*Amer. J. vet. Res.* **11.** 159-160. [Author's conclusions copied verbatim.] **2441**

Homogenization prevented settling out of egg yolk in egg-yolk citrate diluent up to dilutions of 3 parts egg yolk to 5 parts citrate solution. Lyophilized buffered egg yolk may be reconstituted and used as a semen diluent. Complete reconstitution of the lyophilized product was not possible. Pasteurized egg-yolk sodium citrate diluent stored under refrigeration offers a sterile diluent that can be prepared in large quantities and used as needed.

**NOODER, H. J. (1950.)** Enkele mededelingen omrent de K.I. bij teven en het sperma van reuen. [**Artificial insemination in bitches.**] — *Tijdschr. Diergeneesk.* **75.** 81-94. [English, French and German summaries. Abst. from English summary.] **2442**

The technique of artificial insemination in dogs is described. Semen was collected with an artificial vagina similar in principle to the type used for bulls, or by masturbation. Insemination was carried out with undiluted semen using a long ebonite catheter and a glass syringe. The quality of dog semen is discussed.—E.G.

**HAMMOND, J., JR. (1949.)** Induced twin ovulations and multiple pregnancy in cattle.—*J. agric. Sci.* **39.** 222-225. **2443**

Work described in the author's earlier paper [see *V.B.* **15.** 304] revealed that there was a considerable individual variation in response to pregnant mare serum (given during oestrous cycle), when dose and time in relation to cycle were constant. This constitutes a practical drawback because either too few sets of twins or too many triplet conceptions result from a standard dose. Cattle used for the fresh work were not slaughtered. Only 2 out of 19 injected with 2,000 I.U. gave twin ovulations; the others were unaffected. But using 2,500 I.U., only 13 out of 21 remained unaffected and there were five twin and three multiple ovulations. The best results were from injection from 3-5 days before heat. 2,000 I.U. given two days before corpus luteum expulsion, with a further 1,000 I.U. at the time of expulsion, appeared almost equally efficient. To date no variant of the treat-

ment tried approached a commercially worth-while degree of reliability.

[The route of injection is not specified in this paper, but was presumably subcutaneous as in the earlier work. The dosage is admittedly computed only very roughly.]

—F. L. M. DAWSON.

**HAQ, I. (1949.)** Causes of sterility in bulls in Southern England.—*Brit. Vet. J.* **105.** 71-88; 114-126; 143-150; & 200-206. **2444**

H. made a thorough investigation into the reproductive performances of 41 bulls. Investigations were carried out under the following headings: history, examination of preputial washings, behaviour at service, semen examination, clinical examination, re-examination, treatment and P.M. findings. The characteristics of the semen considered were volume, colour, pH, motility, longevity, density, abnormal spermatozoa, degeneration and the presence of tissue cells, bacteria and moulds.

Eight of the bulls were fertile and 33 partially or completely sterile, including 19 cases of testicular degeneration, four cases of testicular hyperplasia, three cases of balanitis, three cases of paunchiness, three cases of faulty erection and one undiagnosed condition. Detailed case histories of the 33 sterile bulls are given and findings correlated with the diagnosis made. Six cases of testicular degeneration were treated, three with pregnant mare's serum and three with ascorbic acid. A course of pregnant mare's serum was followed by improved service behaviour and increased fertility rate. Two of the three ascorbic acid treated cases showed a rise in fertility though this may have resulted from changes in conditions of management which occurred at the same time as the treatment. One case of balanitis which yielded *Corynebacterium pyogenes* responded to a three weeks' course of "Pentaflav" bull cones. The paunchy bulls improved after exercise and changes in diet. Two cases of faulty erection were treated with pregnant mare's serum. One failed to respond and the other treatment was not completed at the time of writing.

—E. J. H. FORD.

**OKLJESA, B., & PENAVIN, V. (1948.)** O problemu jalovosti krava kod nas. [**The problem of sterility in Yugoslav cows.**]—*Jugoslav. vet. Glasn.* **2.** 6-25. [Abst. from *V.B.* **15.** 304.]

from Russian summary.]

**2445**

Between 1932-46 the Veterinary Faculty at Zagreb examined 3,505 sterile cows and heifers. In 7.3% no lesions were found; in the remainder the distribution of lesions was: in the vagina 8.8%, cervix 4.8%, uterus 53%, oviduct 3% and ovaries 22.8%. Microscopic examination revealed that 8.8% of all lesions were caused by *Trichomonas* infection, but from a study of the history in all these cases the percentage appeared to be 10-15%.

The authors observe that for control of sterility prevention is better than cure. For the particular conditions in Yugoslavia they recommend the use of pedigree bulls, hygienic breeding conditions and proper feeding and management of livestock.

—F.A.A.

ERIKSSON, K. (1949.) Aerftliga fruktsamhetsstörningar hos nötkreatur. [Hereditary sterility in cattle.]—*Nord. Vet.-med.* 1. 791-796.

**2446**

Stressing the difficulties in recognising and genetically analysing types of sterility in which hereditary constitutional factors are involved, E states that they are often modified or intensified by environment, particularly nutrition. He summarizes conclusions formed from his studies, covering a period of nearly 20 years, of the strictly localized Swedish Highland breed of cattle of about 6,000 head. Three different, genetically independent sexual anomalies have so far been recognized. (1) Varying degrees of hypoplasia of the reproductive glands affecting their generative tissues occurs in both males and females. Most frequently the anomaly involves the left gland only 82% of all cases), more rarely the right (3.4%) and in 14.5% both glands are affected. Unilateral under-development usually causes partial sterility, whereas hypoplasia of both glands leads to total sterility with the libido retained or even increased in the bull (impotentia generandi), but with cessation of oestrus in the cow. The condition has proved to be dependent on one recessive gene with incomplete penetration (averaging about 50% in both sexes). The anomaly in 1930 was affecting about 30% of the animals and threatened to exterminate the entire breed, but by the application of planned breeding principles has now been reduced to 4.5%.

(2) Inability to copulate (impotentia coeundi) may be due to decreased libido, inability to mount and, imperfect erection or incomplete ejaculation. Depressed libido, apparently dependent on hereditary conditioned hormonal disturbances, is the most interesting type from a genetic point of view. The condition may begin with reluctance to serve, probably increasing with age and often ending in total impotence. Within the above named breed of cattle as a whole normal bulls sired 28% impotent male offspring, as compared with impotent bulls which sired 45.8% impotent male offspring, the difference being highly significant.

(3) Cystic degeneration of the ovaries in cows occurs as follicular or lutein cysts. Without distinguishing between the two, normal cows were found to produce 12% cystic female offspring, whereas cystic cows produced 25% cystic female offspring out of a total of 1,347 female offspring of the Highland breed examined. The difference is significant. No correlation was observed between cystic degeneration and milk production capacity. The more intensive feeding of high-yielding cows may influence cyst formation in animals with hereditary disposition thereto.—GUSTAV NÆRLAND.

FISCHER, H. (1950.) Beobachtungen an mit "Hormon X" behandelten Färse und Kühen auf dem Lehr-und Forschungsgut Gross-Kreutz. [Treatment of sterile cows and heifers with "Hormon X" (an oestrogenic preparation, containing folliculin).]—*Mh. Vet.-med.* No. 2. pp. 26-29.

**2447**

"Hormon X," a preparation containing 1 g. of crystallized follicular hormone was tested on an experimental farm. Ten heifers and two cows were injected with 20 ml. each of the preparation and milk yield and growth were compared with those of controls. The preparation stimulated lactation only slightly and clearly inhibited growth; all but two of the treated animals remained sterile. Examination of the ovaries of three animals disclosed that Graafian follicles were not present. The preparation is not recommended for the production of lactation in heifers.

There are tables giving measurements and average milk yield of treated animals over a period of 12 months and five photographs of heifers and controls.—E.G.

**MOULE, G. R. (1950.) Some problems of sheep breeding in semi-arid tropical Queensland.—*Aust. vet. J.* 26. 29-37.**

**2448**

This paper reviews the limited amount of work done in this field, as well as the circumstances which make difficult the maintenance of a satisfactory reproductive level in Merino sheep in tropical Queensland. The soils, topography, vegetation, climate and sheep husbandry of the area are briefly described. Rainfall is very variable in amount from year to year, but falls mainly in the late summer period resulting in an autumn flush of feed. Even in normal years fodder decreases in quantity during the remainder of the season and becomes deficient in protein and vitamin A.

Rams are put with the ewes either in Oct.-Dec., which ensures good lambing feed, or in March-April when nutritional conditions at mating are likely to be good. High summer temperatures result in considerable ram sterility and non-infective diseases of the male reproductive organs are common. Poor nutrition further complicates the male fertility picture as does the introduction of rams from southern districts. High temperatures and evaporation rates may be responsible for lamb losses. The annual proportion of lambs marked, which averages less than 50%, is very erratic.

As economic considerations make likely the continuance of sheep breeding in this region and as the environment cannot be modified greatly, M. suggests research into such problems as ram sterility and wastage, feeding of concentrates, the role of the endocrine and nervous systems in heat regulation and selection for tropical adaptation.—A. A. DUNLOP.

**I. FRASER; A. C. (1949.) Contributions that breeding can make to preventive medicine.—*Vet. Rec.* 61. 97-99. Discussion: p. 100.**

**2449**

**II. DAY, F. T. (1949.) Contributions that breeding can make to preventive medicine.—*Ibid.* 99. Discussion: p. 100.**

**2450**

I. F. suggests that by breeding on genetically sound lines it should be possible to eliminate disease such as those mentioned in the Horse Breeding Act which are thought to be of a hereditary nature. In other cases by careful elimination of animals with

faulty conformation this important predisposition to disease would be avoided.

A tendency to fatness reduces an animal's resistance to disease, and the antibody producing tissues are replaced by fat.

In view of evidence that resistance to certain diseases is inherited it should be possible, by selective breeding methods, to evolve strains of resistant animals.

In man longevity is known to be hereditary and also to be correlated with healthiness. Whether this also obtains in animals should be investigated.

II. D. points out that in breeding strains of animals resistant to disease it will be necessary to ensure that desirable commercial factors such as high milk yields and rapid fattening qualities are maintained. Unfortunately in modern times many animals are used for breeding before they have been kept for a sufficient period to prove that they possess the qualities considered desirable for their type.

Amongst other points brought out in the discussion is the one that many horses, although capable of passing a test of soundness, are of bad conformation and thus likely to produce similar offspring.

—E. J. H. FORD.

**KENNEDY, J. F., & BETTENAY, R. A. (1950.) Mating and lambing in an experimental flock of Merino sheep.—*Aust. J. agric. Res.* 1. 76-92. [Authors' summary copied verbatim.]**

**2451**

Merino ewes, 1278 in all, representing 3 age groups, were pen-mated in 32 lots to individual rams, and a further 200 similar ewes were mated in one lot to 8 rams. The layout of the yards, the techniques employed, and the ration fed to the sheep are described. The reactions by the ewes to the unusual conditions of restraint imposed upon them during both mating and lambing were observed, and it was demonstrated that with care and attention large flocks of Merino sheep are suitable subjects for intense investigations.

Data relating to incidence and duration of oestrus, the length of oestrous cycles, and performance of individual rams were recorded in detail for all animals. Extensive information on all aspects of lambing is examined.

It was found that the age of the dam,

within the range under observation, was associated with lamb losses, birth weight of progeny, and occurrence of multiple births, but was not associated with incidence of oestrus, conception, length of gestation, or sex ratio of progeny. Length of gestation was found to be associated with sex and birth weight of progeny, but not significantly associated with the incidence of single or multiple births.

**SINCLAIR, A. N. (1950.) A note on the effect of the presence of rams on the incidence of oestrus in maiden Merino ewes during**

*See also absts. 2237 (artificial insemination and trichomoniasis); 2275 (artificial insemination and epididymitis and vaginitis); 2276 (epizootic sterility); 2404 and 2423 (semen metabolism); 2476 (book, sheep diseases); 2477-2478 (books, poultry diseases).*

**PHILLIPS, R., & DAVIES, J. L. (1949.) The seasonal distribution of calf and milk sales in West Wales and the probable influence of climatic conditions on the rate of calving during the autumn months and on the consequent milk production.—J. Dairy Res. 16. 1-13.** 2453

The coastal area of West Wales has a markedly higher output of autumn calves than the inland area lying to the east; towards the coast winter milk production also is maintained at a higher level. The authors consider various possibilities against a literary background, and conclude that the fundamental cause of these differences is probably climatic. The coastal area has an average of about 8% more sunshine and at least 3° F. higher mean temperature than the inland area during the first three months of the year. A mean temperature for the critical period of 42° F., which appears to delimit the area of relatively successful winter mating, is that generally accepted to be the vital temperature for the growth of grass; within this area, too, the cattle receive more exercise, a factor which has been proved to stimulate reproductive processes in birds.—F. L. M. DAWSON.

**GODFREY, G. F., & JAAP, R. G. (1949.) The relationship of specific gravity, 14-day incubation weight-loss and egg shell color to hatchability and egg shell quality.—Poult. Sci. 28. 874-889. [Abst. from authors' summary and conclusions.]** 2454

*See also absts. 2314 (gematox dips); 2316 (benzene hexachloride dips); 2448 (sheep breeding in tropical Queensland); 2474 (book, animal psychology); 2476 (book, sheep distases); 2477-2478 (books, poultry diseases).*

**spring mating.—Aust. vet. J. 26. 37-39.** 2452

In a flock of 146 maiden ewes, vasectomized rams were used to detect for service ewes in oestrus during a spring mating period. A marked peak of two days' duration in numbers of ewes in oestrus was observed 15 days after the introduction of teaser rams. This tends to confirm a previous observation, and it is suggested that the use of vasectomized rams with maiden Merino ewes for two weeks prior to mating may be a sound practice.—A. A. DUNLOP.

## ZOOECHNY

Data were collected from 3,657 randomly selected eggs of the Ohio Strain of New Hampshires for a 35-week period and from 3,050 eggs of the Oklahoma Strain of New Hampshires for a 15-week period.

Of the two strains studied, egg shell color, specific gravity and 14-day incubation weight-loss were associated with hatchability and with egg shell quality as measured by shell thickness and breaking strength; eggs with dark brown shells, eggs with a high specific gravity and eggs with a low 14-day incubation weight-loss hatched better than eggs at the opposite ends of their respective scales presumably because they lose less moisture and have less variability of moisture-loss during incubation.

Breeders may use shell color, weight-loss, or specific gravity of the eggs as a guide to improve hatchability and resistance to breakage, specific gravity being the most efficient.

Birds may be classified on the basis of 12 eggs laid in March, tested for specific gravity, 14-day incubation weight-loss and egg shell color.

**PAVLIK, V. (1949.) Zivocisna výroba a pojisteni. [Animal husbandry and livestock insurance.] — Cas. československ. Vet. 4. 501-503.** 2455

A general discussion on the advantage to animal husbandry in Czechoslovakia of nationalized obligatory insurance of livestock.—E.G.

## TECHNIQUE AND APPARATUS

SCHMIDT, C. F. (1950.) A method for the determination of the thermal resistance of bacterial spores.—*J. Bact.* **59**. 433-437. [Author's summary amended.] **2456**

A method for the determination of the thermal death time of bacterial spores has been described. It introduces the use of thermocouples to provide an accurate correction of lethality of the come-up time in each experiment and the use of cotton-plugged tubes cooled under pressure to allow subculture by direct addition of the medium to the heated spore suspension.

SCOTT, N. B., & SMITH, D. T. (1950.) A simple modification of the Middlebrook and Dubos hemagglutination test for serum antibodies to products of tubercle bacilli.—*J. Lab. clin. Med.* **35**. 303-307. [Authors' summary modified.] **2457**

A hemagglutination test has been described for the demonstration of antibodies in human sera to the products of tubercle bacilli. It is a test which can be performed in a half day's time, to be read the following morning. Old tuberculin used in sensitizing the red cells to be used as an antigen is commercially available and sufficiently stable to be stored for a relatively long period of time at a temperature of 4°C.

The data available at present indicate that the test is specific for antibodies of tubercle bacilli found in human antisera.

COOK, G. T., & KNOX, R. (1949.) Bacteriological examination of faeces.—*J. Path. Bact.* **61**. 353-358. [Authors' summary copied verbatim.] **2458**

The combined use of a screening plate, a rapid urea test and a rapid indole test in the routine bacteriological examination of faeces is described. The method has been employed in the investigation of over a thousand colonies and has proved of particular value in the rapid recognition of presumptive pathogens and the early elimination of non-pathogens. The advantages of picking colonies on to a single solid medium in the early stages of investigation are discussed, while the flexibility available in the later stages is emphasised.

KNOX, R. (1949.) A screening plate for the rapid identification of faecal organisms.—

*J. Path. Bact.* **61**. 343-351. [Author's summary copied verbatim.] **2459**

A screening medium has been devised, suitable for the rapid identification of pathogens and rapid elimination of non-pathogens in the routine bacteriological examination of faeces. The medium is poured in Petri dishes in two parts. Part A, consisting of lead acetate, sodium thiosulphate and full strength tryptic heart broth in 2 per cent. agar, is poured with the Petri dish inclined at a slight angle. When this has set part B, consisting of sodium desoxycholate, lactose, neutral red and half-strength tryptic heart broth in 2 per cent. agar, is poured with the Petri dish flat. After the plate has been inoculated two glass coverslips and two strips of blotting paper soaked, one in 50 per cent. mannitol and the other in 50 per cent. sucrose, are placed on the heavily inoculated part of the plate. After overnight incubation the medium indicates spreading of *Proteus*, pigment production of *Pseudomonas*, sucrose and lactose fermentation, fermentation of mannitol with or without gas production, and production of H<sub>2</sub>S. The purity of the cultures can be readily checked, the characteristic smell produced by many intestinal organisms is well developed on the medium and single colonies are available for inspection of colony form and for serological investigation. The coverslip placed near the mannitol slip indicates accurately gas production, while the coverslip on the lead acetate-thiosulphate part of the medium gives clear-cut indication of H<sub>2</sub>S production. The medium is easy to prepare, keeps well on storage and gives rapid and accurate results.

CASSEL, W. A. (1950.) The use of perchloric acid in bacterial cytology.—*J. Bact.* **59**. 185-187. [Author's summary copied verbatim.] **2460**

The perchloric acid method is offered as a new procedure in bacterial cytology. Among other purposes, it may serve to prevent controversy concerning artifacts in bacteria due to heating. Furthermore, the results obtained in using perchloric acid on bacteria support the current concept that the "chromatinic bodies" demonstrated in bacteria are composed of desoxypentose nucleic acid.

VALENTINE, F. C. O., & JOHNS, R. G. S. (1949.) A suggested method for the titration of certain antibiotics. — *Lancet.* 257. 1033-1034. **2461**

Acidified broth containing 0.5% urea and phenol red was found to be a satisfactory medium for the titration of antibiotics, such as penicillin and aureomycin, which are more active in acid than in alkaline solution. The test organism used, the Oxford staphylococcus, produces urease which releases ammonia from the urea and produces a pH of 8.3 or more after incubation overnight. The end-point of titrations of the two antibiotics was much sharper when urea broth was used than with glucose, serum water and indicator or with nutrient broth. The method was developed for use in titrating antibiotics in human serum.

—E. G. WHITE.

LENDRUM, A. C. (1947.) The phloxin-tartrazine method as a general histological stain and for the demonstration of inclusion bodies. — *J. Path. Bact.* 59. 399-404. [Authors' summary copied verbatim.] **2462**

The phloxin-tartrazine method of counterstaining after haemalum is described as an easily performed and useful procedure, giving the type of result seen after Masson's erythrosin-saffron method.

By prolonged differentiation with the tartrazine there is revealed a strong phloxinophilia of certain inclusion bodies, which can thus be rendered the only red-stained element in the section, enabling them to be picked out with great ease even when scanty.

OBEL, N. (1949.) Ventilationsapparat för intrathorakala ingrepp paa större djur. [Ventilation apparatus for intrathoracic operations on large animals.] — *Nord. Vet.-med.* 1. 388-394. [English summary.] **2463**

See also absts. 2183 (precipitin test in human TB.); 2470 (book, bacteriological technique).

#### MISCELLANEOUS

CRONKITE, E. P. (1950.) The hemorrhagic syndrome of acute ionizing radiation illness produced in goats and swine by exposure to the atomic bomb at Bikini, 1946. — *Blood.* 5. 32-45. [Author's summary and conclusions copied verbatim.] **2465**

The author described a ventilation apparatus, illustrated by diagram and a photograph, for thoracotomy on large animals constructed on the principle of rhythmic intratracheal insufflations. Two hard rubber tubes are connected to an enlarged model of Magill's tracheotomy tube which is made to fit tightly to the lumen of the trachea by means of an inflatable rubber bulb. Through a manually operated valve the two tubes are alternately connected with the compressor and atmospheric air. The outlet of an ordinary electric vacuum cleaner serves as compressor and yields, after being run for a while, a sufficient pressure of pre-heated air. The intra-bronchial pressure is registered through a special thin rubber tube attached to a water manometer. Respiration is controlled by alternating the pressure from 0 to 150 mm. At the rate of ten insufflations per min. the apparatus gives a ventilation volume of 80 l. per min. in a medium sized horse. The apparatus has been used on four horses and two cows with satisfactory results. By means of the apparatus a horse with its chest cavity opened was kept breathing for two hours without any significant changes of the blood oxygen or carbon dioxide. Complete narcosis is necessary—the author used derivatives of barbituric acid.

—GUSTAV NÆRLAND.

HOFFMAN, W. (1947.) Die einfache chemische Identifizierung der Sulfonamide in der Praxis des Tierarztes. [Simple chemical method for identifying sulphonamides in veterinary practice.] — *Dtsch. tierärztl. Wschr.* 54. 250-252. **2464**

A description of chemical methods, using some 24 reagents, for identifying the 11 most commonly used German sulphonamide preparations.—MALCOLM WOODBINE.

The hemorrhagic syndrome of acute radiation illness in goats and swine has been described. This syndrome is predominantly a result of a combination of "increased vascular fragility" and thrombopenia. Infrequently, a blood coagulation defect characterized by a prolonged clotting time

due to a circulating anti-coagulant with heparin-like properties appears, thus confirming under some conditions in goats and swine the work of Allen on "heparinemia" in irradiated dogs. The prolonged blood coagulation time appeared only in fatally irradiated goats and swine. Evidence was presented suggesting that serum fibrinolysins may have been activated.

It is concluded on the basis of this work

and that of others that a hemorrhagic syndrome can develop in irradiated dogs, goats, swine, rats, chickens and guinea pigs without the appearance of a prolonged clotting time and without a detectible "heparinemia." The biologically most universal phenomena observed in the hemorrhagic syndrome of radiation illness appear to be: (a) increased vascular fragility, (b) thrombopenia, and (c) ulcerations.

## REPORTS

**NEW ZEALAND.** (1948). **Department of Agriculture. Annual report for year 1947-48.** [CULLEN, E.] pp. 86. Items of veterinary interest pp. 48-79. Wellington: E. V. Paul. 1s. 9d. **2466**

The report of the Director, Livestock Division, gives a general account of animal production and animal health under the following main headings: Climatic conditions; Health of livestock; Swine husbandry; Meat inspection and slaughter of stock; Importation of stock; Exportation of stock; Dairy inspection; Poultry; Wool; Rabbit nuisance; and Noxious weeds.

The report of the Director, Animal Research Division, deals with diagnostic and research activities and briefly summarizes progress in projects dealing with the following subjects:

Sheep breeding. Sheep nutrition. Sheep diseases. Dairy cattle breeding, including artificial insemination. Dairy cattle nutrition. Identical twins. Milking methods. Cattle diseases. Pig problems. Trace elements. Parasitology. Agriculture.

—J. F. FILMER.

**NEW ZEALAND.** **New Zealand Dairy Board. Twenty-fourth Annual Report for the year ended 31st July, 1948.** pp. 60. Items of veterinary interest pp. 7, 37, 44-49, 50-53. Wellington: New Zealand Dairy Board. **2467**

Report of the Director of Herd Improvement. Surveys dairy herd testing and associated investigations. Sections are devoted to the following topics:—

Non-stripping. Production of cows milking on threequarters only. Effect on fertility of vaccination with strain 19 vaccine. Wastage amongst twins, and their production as two-year-olds. Artificial insemination.—J. F. FILMER.

**GOLD COAST COLONY.** (1949). **Report on the Department of Animal Health for the year 1948-49.** [SIMPSON, S.] pp. 12. Accra: Govt. Printing Dept. 1s. **2468**

An increase, over recent years, of the cattle population to its present figure of 350,000 has been associated with a deterioration in quality owing to lack of food during the dry seasons. It is clearly seen that improvement of livestock is dependent on an improvement in the conditions under which existing stock is kept.

**CONTAGIOUS BOVINE PLEURO-PNEUMONIA.** This common disease was most serious in the Coastal Veterinary Sector where water shortage was responsible for large concentrations of cattle at the water holes. Adults, but not young stock, were protected with a strain of vaccine made at Pong-Tamale Laboratory. Clearance work for control of TRYPARASOMIASIS was limited by shortage of staff for supervision. Pigs were found to become heavily infected with *Trypanosoma vivax*, but had no clinical symptoms. Five outbreaks of RINDERPEST among indigenous cattle are reported while the disease was noted regularly in imported herds. Goat virus was in use and the strong reactions, seen particularly in cattle other than zebras, were controlled with serum.

—S. BRIAN KENDALL.

**SIERRA LEONE.** (1949). **Annual Report of the Department of Agriculture for the year 1947.** pp. 54. Freetown: Govt. Printer. [8 vo.] Items of veterinary interest pp. 6, 7, 15, 16, 24, 25, 36-39. **2469**

The headquarters of the Veterinary Department is to be at Teko.

A ten-year development plan provides for the establishment at Musaia of a live-stock and animal research station for work

on cattle. At Teko during 1947 feeding trials and selection by milk yields were continued. The average milk yields since 1944 have risen from 390 lb. to 1,108 lb. The Ndama herd at Njala was used for grassland experiments and working purposes. Milk yields were also recorded. One cow died of ARSENICAL POISONING.

The modern piggery at Newton, Freetown, established in 1945 continued to be the main centre for investigations in husbandry. At the end of the year there were 182 pigs at the three stations Newton, Njala and Kenema, while an additional 70 pigs had been distributed to local farmers for breeding purposes and 56 had been sold for slaughter. The provision of a suitable local source of food supply is a problem which has yet to be solved.

Trouble possibly from malnutrition has already been experienced among Nigerian Large White sows after parturition showing weakness or paralysis in the hind quarters.

WORM INFESTATION in young pigs was controlled by treatment. One sow had TRYPANOSOMIASIS which responded to treatment with antimosan. In an experiment it was shown that sweet varieties of cassava may be fed unpeeled without ill effect.

#### BOOK REVIEWS

McEWEN, W. W. W. [A.I.M.L.T., F.R.M.S., Chief Technician, Pathological Laboratory, Neath General Hospital.] (1949.) **Bacteriological technique. A guide for medical laboratory technicians.** pp. viii + 293. London: J. & A. Churchill, Ltd. 15s. **2470**

This book will be welcomed because it fills a real gap in the existing literature on medical laboratory technology. It contains a wealth of detail of everyday technique, which has the backing of the author's wide practical experience, and will be of great avail to junior laboratory workers in the course of their training. Apart from the usual laboratory procedures the book includes chapters on subjects such as glass blowing technique, laboratory book-keeping, care of equipment, etc., which are not usually included in such books. It might be suggested that the book suffers from a certain superficiality especially with regard to the chapters on sterilization and centri-

Poultry distribution from Newton and Njala stations was 115 birds for breeding, eggs incubated 1,932 and eggs sold for hatching 1,275. Chick mortality from FOWL Pox and predatory animals was severe.

*Glossina palpalis* feed on domesticated livestock and to a lesser extent on man. "The people are not in the least concerned about tsetse fly and do not believe they are associated with sickness. This is not surprising as there is very little TRYPANOSOMIASIS among man or animals. Surveys in riverine villages have failed to produce a single case of trypanosomes in the blood, even among the more susceptible pigs."

In the cattle country round Musaia the herdsman consider tabanids the most noxious flies. *Tabanus taeniola* was the only species caught in that area; at Newton *T. fasciatus*, *T. pluto*, and *T. taeniola*.

In Sierra Leone the following *Stomoxys* species occur—*S. calcitrans*, *S. nigra*, *S. brunnipes* and *S. pallida*. The first two are the commonest. They feed at all times of the day and are a constant source of irritation to animals. Sick or lame animals undergo concentrated attacks and can be killed by these pests within a few days.

—J. A. GRIFFITHS.

fuges, and although it is much to the credit of the author to have included a whole chapter on the care of laboratory animals, it would be difficult to agree with certain statements made on this subject. Generally, the book is well presented, but although the style is sincere and convincing, it could be improved and the numerous exclamation marks might be removed to advantage.

—B. WEITZ.

PINCUS, R. [Edited by.] (1949.) **Recent Progress in Hormone Research. The Proceedings of the Laurentian Hormone Conference.** Vol. IV. pp. 529. New York: Academic Press, Inc. \$8.80. **2471**

This is a collection of the papers delivered at the Laurentian Hormone Conference in New Hampshire in 1948. The papers are divided in four main groups: (a) steroid hormone metabolism *in vivo* and *in vitro*, (b) the role of the hormones in tissue and body metabolism, (c) neuro-hormonal

hypothalamic relationships, and (d) thyroid physiology and function. This work is intended for the specialist and research worker. The main emphasis throughout is on the clinical importance of recent hormone studies and applications in human medicine. There is a wealth of interesting and stimulating material of indirect interest to the comparative endocrinologist.

—ALFRED T. COWIE.

FULTON, J. F. [Edited by.] [M.D., Sterling Professor of Physiology, Yale University School of Medicine.] (1949.) **A textbook of physiology.** pp. xi + 1258. Philadelphia & London: W. B. Saunders Co. 16th Edit. 50s. **2472**

This new edition of Howell's well-known Text-Book on Human Physiology has been edited by Prof. Fulton in collaboration with twelve other leading American physiologists, the text being compiled by 29 different authors. This arrangement was first adopted in the 15th Edition and has entirely altered the character of the book from that of earlier editions. Since each section has been written by an authority specialising in that particular branch of physiology, the scope of the book has been greatly increased and a good deal of controversial matter has been introduced. This has its advantages and also, from the student's point of view, its disadvantages for at times the text becomes overburdened with details and the clear, precise style of Prof. Howell is often sadly lacking.

More than half of the text is devoted to the Central Nervous and Circulatory systems, the cardiac cycle and the electrical changes in the heart being very fully dealt with. Wherever possible the application of the findings to clinical medicine is discussed, particularly with regard to the interpretation of electrocardiograms. The remaining sections are treated adequately, but it is perhaps surprising to find no mention of the physiology of the foetus nor a clear account of parturition.

This book can be recommended with confidence to the advanced student and research worker, for all the latest developments in physiology are included and the controversies which occupy present day physiologists are discussed in some detail.

—J. A. NICHOLSON.

PETERSON, W. H. [Ph.D., Professor of Biochemistry, University of Wisconsin, Madison], SKINNER, J. T. [Ph.D., Assistant Chemist, Kentucky Agricultural Experiment Station, Lexington], & STRONG, F. M. [Ph. D., Associate Professor of Biochemistry, University of Wisconsin, Madison.] (1949.) **Elements of food biochemistry.** pp. xi + 259. London: Staples Press, Ltd. New York: Staples Press Inc. 1st Edit. 21s. **2473**

The first three chapters of this book are concerned with carbohydrates, fermentation of food products and problems of acidity. This is followed by a discussion of lipoids and proteins. The other chapters deal with minerals, water, vitamins and enzymes. Individual foods are not discussed in detail, but extensive food composition tables are given in the appendix.

This book is a very good introduction to the elements of food chemistry. It is written for students or those unacquainted with the field, but it also contains some data, especially in the tables of trace elements and vitamin content of foods, which have so far not been published and will therefore be useful to a large number of other readers.

—E. EDEN.

PETERS, H. M. (1948.) **Grundfragen der Tierpsychologie. Ordnungs- und Gestaltprobleme. [Animal psychology.]** pp. 117. Stuttgart: Ferdinand Enke. DM. 17. **2474**

This book deals mainly with two aspects of animal instinct of which the author has made a special study—the behaviour of the young in father-families and mother-families of various species of fish and the structure of the spider's web. Much of the work on the former is published here for the first time. There are also references to territory building among birds and the structure of the honeycomb of the bee.—E. G. WHITE.

MEDVEI, V. C. [M.D., M.R.C.P., Associate Chief Assistant, Endocrine Clinic, St. Bartholomew's Hospital, London.] (1949.) **The mental and physical effects of pain.** pp. 59. Edinburgh: E. & S. Livingstone, Ltd. 3s. **2475**

In this Buckston Browne Prize Essay of the Harveian Society of London the author gives a short review of present know-

ledge on the subject of pain and indicates the considerable gaps which remain. For those who wish to pursue the subject there are many references to published work.

There is no satisfactory definition of pain. Pain possesses no obvious sense-organ and concerns every part of the body. It can be considered to be a sensation because, like the other senses, it has a threshold, is localized, can be referred to a stimulus, has established pathways and has representation in the spinal cord and in the lateral nucleus of the optic thalamus. It differs from the other senses in that it is "much closer to the centre of the personality." The manifestations of pain in phantom limbs and other missing organs have provided much discussion during recent years. The perception of pain can be modified by hypnosis, severe emotional effort, psychological training (Dick Read's method for painless childbirth) or by drugs. Pain is also modified in low-grade mental defectives and in very young babies, mainly by lack of intelligence and impaired memory.

Pain in animals is little understood. The perception of pain is inseparable from consciousness: animals without consciousness do not experience pain as we visualize it. Without a cortex an animal might experience pain through activities in the optic thalamus, but it could not "suffer" through memory or apprehension.

—E. G. WHITE.

CRAPLET, C. (1950.) Maladies du mouton et de la chèvre. [Diseases of sheep and goats.] pp. 138. Paris: Vigot Frères. Fr. 480. **2476**

This book is written more for the agriculturist than the veterinarian. It begins by dealing with the various causes of

*See also abst. 2318 (entomological nomenclature and literature).*

#### BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

AZZI, A. (No date.) Microbiología e inmunología. [Microbiology and immunology.] Vol. I. pp. xiv + 585; Vol. II. pp. viii + 800; Vol. III. pp. xi + 841. Milano: Dr. Francesco Vallardi.

BARDOULAT, M., & CHARBONNIER, J. (1949.)

disease followed by a chapter on reproduction. Thereafter there are chapters on diseases of lambs, parasitic diseases of sheep, bacterial diseases of sheep and miscellaneous diseases. There are also chapters on disinfection and castration and one dealing with the constitution and selection for breeding. Reference is made in the text to diseases of goats in cases where both sheep and goats can be affected, but the book deals mainly with sheep.

For the French farmer it may be of some value, but in Britain there are more concise and up-to-date books on the same subject.—P. L. SHANKS.

LERCHE, M. (1949.) Die Geflügelkrankheiten. [Diseases of poultry.] pp. 51. Berlin: Landbau-Verlag GMBH. DM. 1.25. **2477**

A brief outline of the more common diseases of domestic fowls for the poultry breeder. There are four chapters dealing respectively with general matters, infectious diseases, parasitic diseases and nutritional diseases.—E.G.

VESELY, J. (1948.) Nemoci drubeze. [Diseases of poultry.] pp. 116. Prague. Nakladatelství Brázda. Kcs. 39. **2478**

This booklet is one of a series written for farmers. A brief introductory note on housing and general management is followed by chapters on infectious diseases, including paragraphs on ecto- and endoparasites, deficiency diseases, poisoning, diseases of the reproductive system and other diseases of organs. There are many illustrations and diagrams.

In the attempt to cover such a large field in so short a space, many important diseases like Newcastle disease and black-head, for instance, are not mentioned.—E.G.

Précis d'urologie. [Précis of urology.] pp. 85. Toulouse: Imprimerie Régionale. Fr. 208.

BERG, H. (1948.) Wetter und Krankheiten. [Weather and disease.] pp. iv + 140. Bonn: H. Bouvier & Co. DM. 6.50.

## INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

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## TECHNICAL COMMUNICATIONS, ETC.

Commonwealth Bureau of Animal Health, Weybridge.

Review Series No. 2. Modes of spread of *Streptococcus agalactiae* infection in dairy herds. A report on co-ordinated observations by the Agricultural Research Council of the United Kingdom. May, 1944 .. . . . .

Commonwealth Bureau of Animal Nutrition, Aberdeen.

## SUBSCRIPTIONS